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ABSTRACT

Accused of harboring and supporting terrorists, Saddam Hussein's country of Iraq sits at the top of a short list of targets in United States war on terrorism. Iraq is a country about twice the size of the state of Idaho with a population of over 22 million. The country relies on oil for its economic well-being and controls what some estimate to be the second largest reserve in the world. The 5000-year history of the land between the rivers (Mesopotamia), has shown that armies conquer, are conquered, governments rise and fall, and there is no reason to predict that the future will not follow the same script. This collection of articles, written by the geography faculty of the U.S. Military Academy (West Point, New York), is meant to educate military and governmental leaders as they consider diplomatic and military solutions to deal with Iraq's threat to the region and to the world. Chapters in the collection are: (1) "Introduction" (Wendell C. King; Eugene J. Palka); (2) "Location" (Wiley C. Thompson); (3) "Geomorpholgy" (Matthew R. Sampson); (4) "Climate" (Richard P. Pannell); (5) "Vegetation and Soils" (Peter G. Anderson); (6) "Historical Geography" (James B. Dalton); (7) "Cultural Geography" (Jon C. Malinowski); (8) "Political Geography" (Andrew D. Lohman); (9) "Economic Geography" (Albert A. Lahood); (10) "Population and Urban Geography" (Dennis D. Cowher and Brandon K. Herl); (11) "Medical Geography" (Patrick E. Mangin); (12) "Conclusion" (Jon C. Malinowski); and "Bibliography" (Jeffery S. W. Gloede). (BT)

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IRAQ

a geography

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Introduction by Wendell C King & Eugene J Palka

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DEPARTMENT OF THE ARMY
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Executive Summary

The events of September 11, 2001 have once again thrust Iraq onto the world stage. Accused of harboring and supporting terrorists, Saddam Hussein's country sits at the top of a short list of targets in America's "War on Terrorism". This book, written by the Geography faculty of the United States Military Academy is meant to educate military and governmental leaders as they consider diplomatic and military solutions to deal with Iraq's threat to the region and to the world.

Iraq is a country about twice the size of Idaho with a population of over 22 million. Located in the heart of the Middle East, it borders Turkey, Iran, Kuwait, Saudi Arabia, Jordan, and Syria. Over 40% desert, the terrain of Iraq includes large flat expanses deeply cut by rivers and wadis (river beds that are dry much of the year). Mountains rise to over 12,000 feet in the north.

In terms of weather and climate, the country is mostly dry and hot, although mountains in the north provide cooler temperatures and more rainfall. Because of the climate and terrain, natural hazards such as drought, flooding, sand and dust storms, and earthquakes are possible. The main sources of water are the fabled Tigris and Euphrates Rivers, water bodies that are vital to Iraq yet rise in Turkey. Water is a continuing source of conflict in the region. Vegetation in Iraq is extremely sparse with exceptions in the northern mountains and marshy areas near Basra in the south.

Historically, this area is considered by many scholars to be the cradle of humanity. Ancient Mesopotamian civilizations, such as the Sumerians and Babylonians, contributed cultural elements that are still important to us thousands of years later. Over time, the area was conquered time and time again, producing diverse cultural patterns. Many religions are practiced, but Islam (both Sunni and Shiite sects) accounts for 97% of all Iraqis. The country includes many of the holiest shrines of Shiite Islam. Iraqis speak 23 languages with various forms of Arabic dominating. Kurdish dialects are spoken by about 20% of the population, representing the differences between much of Iraq and "Kurdistan" in the north. Kurds have long been used as political

pawns in struggles among Iraq, Iran, and Turkey. Although Saddam Hussein's Sunni-dominated Baath Party dominates, Kurds and southern Shiite groups are political players but have suffered from Hussein's repressive techniques.

Iraq relies on oil for its economic well-being and controls what some estimate to be the second largest reserve in the world. Beyond oil and natural gas, Iraq's economy is weak and even the once fertile agricultural areas have been hurt by water diversion schemes, salinization, and rural-to-urban migration. United Nations sanctions have added to the economic malaise.

Despite economic problems, Iraq's population continues to grow at a rate of just under 3% per year, which means the country could double in size in about 25 years. Today, roughly 40% of the population is under age 15. Other demographic statistics indicate that Iraq's population is worse off than their neighbors in terms of life expectancy, nutrition, and infant mortality.

Health is a concern not only for the Iraqi people, but also for soldiers or aid workers entering the country. A variety of diseases and hazards pose a risk and care should be taken by those traveling to the region. Malaria, typhoid, tuberculosis, and cholera are all endemic in Iraq.

Iraq presents a difficult diplomatic and military situation for the United States and her allies. Physical and environmental challenges are real, and cultural diversity raises questions of loyalty and support should hostilities break out in the region. The 5000 year history of the "land between the rivers", of Mesopotamia, has shown that armies conquer and are conquered and governments rise and fall, and there is no reason to predict that the future will not follow the same script.

Jon C Malinowski, PhD
Associate Professor of Geography
Editor, *Iraq: A Geography*

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1
Introduction

COL Wendell C King, PhD
COL Eugene J Palka, PhD

Key Points:

- The events of September 11, 2001 changed U.S. foreign policy in dramatic ways
- Iraq has been accused of harboring and supporting terrorist groups, and has used weapons of mass destruction against its own people and foreign soldiers
- This work provides an overview of Iraq from a regional geographic perspective that covers both human and physical patterns
- This work is not meant as a blueprint for any action against Iraq, but rather as an educational tool for policy makers and military planners

Our country has changed since September 11, 2001, a day etched in the memory of this generation of Americans for all time. The United States was confronted with the reality that America is not safe, even at home, from its enemies. Terrorists had declared war on the United States and the country decided it must fight back. The signs had been there for a while-- Khobar Towers in Saudi Arabia, the embassies bombed in Africa. However, these attacks had failed to move the country to decisive action. Now, the United States has declared war on terrorism wherever it lives or hides. America leads a coalition of countries seeking to destroy the reservoir of terrorism located in Afghanistan, while recognizing that this can only be the beginning if the world is to truly be rid of this scourge.

Iraq is one of the countries in the world clearly linked to harboring and supporting global terrorism. Few in the world took early note of this country and its dictatorial leader, Saddam Hussein, but again, there were signs that should have elicited concern. First, recall Iraq's actions during the long and bloody war with Iran, including suspected use of chemical agents. The world subsequently paid more attention when it learned of Sad-

dam Hussein's inhumane treatment of his own people, especially his use of chemical weapons on Iraq's Kurdish civilian populations. Unfortunately, it was not until Iraq moved its Army into Kuwait in August of 1990 when the world fully recognized the danger Iraq posed to stability and peace in the world.

Iraq was expelled from Kuwait with a great loss of human life, mostly Iraqi. Furthermore, there were lessons to be learned from Iraq's actions during the Gulf War that should now be factored into American policy. First, Iraq's decision to line up toe to toe against America and its allies, despite having the fifth largest Army in the world and fighting in their homeland, was not strategically sound. The subsequent was that asymmetric operations and acts of terror should be an anticipated part of strategies to wage a war against the United States and its allies. Consider here that the purpose of war is to impose one's will or ideas on another people. Or, as Clausewitz stated in his 1814 treatise *On War*, "war is nothing but the continuation of policy with other means." Asymmetric attacks are the only realistic options available for America's enemy to impose their will in conflict with the United States. A final policy lesson reinforced in America's actions in Iraq was that the United States is traditionally slow to act militarily to provocation short of outright aggression against our direct interests. This should be viewed not as a criticism, but rather a recognition of a policy that served the United States well in its dealings with the realities of the Cold War.

Today, the United States must measure the danger that Iraq poses to world peace and security against its national interests. America must decide how to respond to the threats posed by terrorism and those countries that foster and harbor terrorists. The United States has at its command the full range of policy options as described by Clausewitz, from diplomacy to war.

The first rule of war, written in the earliest records of strategic studies was, "Know the enemy, know yourself, and your victory will never be endangered. Know the ground, know the weather, and your victory will then be total." So stated Sun Tsu in *The Art of War*, written some time before 200 BC. Some find this guidance passé, while others believe Sun Tsu was only a mythical character created to serve as the reservoir for what was the collective strategic wisdom of the Chinese strategists of that time. However, many modern scholars of war, including the highly respected B.H. Liddel Hart, find the advice of Sun Tsu to be enduring. Quoting Hart " in that one short book was embodied almost as much about the fundamentals of strategy and tactics as I had covered in more than twenty books."

Knowing the enemy, knowing the terrain, and under-

standing weather and climate are considered to be military geographic imperatives by the authors of this book. These authors are uniquely qualified to offer a special perspective on Iraq. First, they are trained geographers representing the breadth of the subdisciplines of geography, within both the physical and human branches. But more, they are also experienced military officers, or in two cases, civilian military geographers, who can add a strategic military focus to the analysis. The tools and methods of the geographer, designed to describe and explain the human and physical patterns on the earth, and the interaction between people and the environment, systematically yield a strategic military perspective that is critical to successful military planning. Again, planning is not just for war, but necessary for considering the full spectrum of policy and diplomacy options available to achieve national interests. This book, then, is a geographer's guide to Iraq, but with the additional purpose of highlighting the information most useful to military and government personnel.

Our goal is to offer a coherent but concise source of information about Iraq and its people. Hopefully, this guide will prove useful to anyone wanting to learn more about the country, and will serve as a point of departure for more detailed descriptions of many of the physical and cultural geographic features summarized herein. Much has been written about Iraq, particularly since the Gulf War, some good, some not as useful from a military perspective. What seemed to be missing was a synthesis of the data into a format that facilitated conceptual understanding of the critical issues that affect international security. This publication is not intended, however, as a policy or strategy document. Strategy and policy necessarily follow these efforts to "*know the enemy...know the ground.*" The publication does, however, provide a systematic yet concise view of the physical environment and the people of Iraq.

Method of Analysis

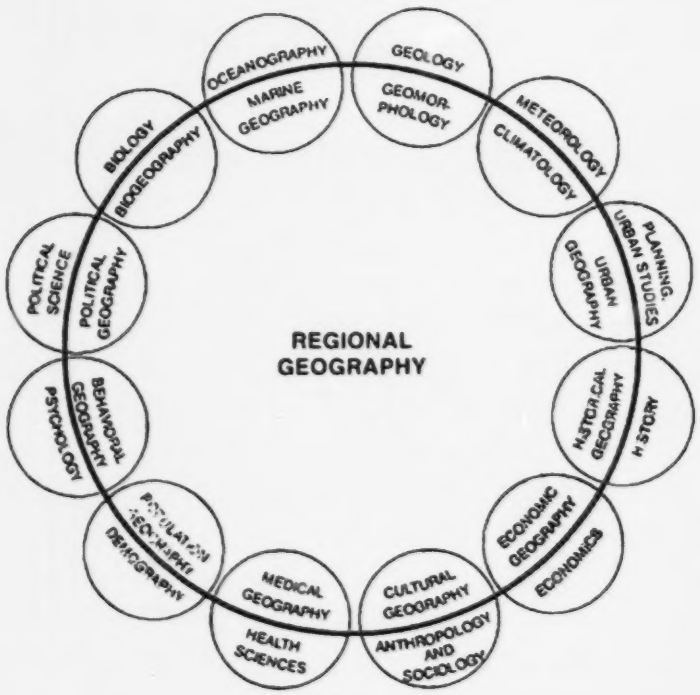
Geographers have an assortment of tools at their disposal to analyze and characterize the earth. Our analysis of Iraq will be accomplished by applying the regional approach, the geographer's most important overarching method (Palka, 2001). Regions are spatial constructs that result from mapping similar characteristics of a place that differentiate it from other places and regions. For example, a region may be defined as the area inhabited primarily by a group of people speaking the same language, practicing the same religion, dressing in similar ways, and having the same economic base. The physical characteristics of a

place may be equally important in helping to describe a region. Thus, regions are defined based on some combination of physical and/or human features within an areal extent.

In describing a region, geographers often organize their analysis into one of the many sub-disciplines used to describe the physical and human characteristics of the world (Figure 1.1). These academic disciplines range from the physical geographic sub-disciplines of climatology and geomorphology to human geography subfields such as population, urban, and cultural geography. This book is organized based on these sub-disciplines, but covers only the areas most critical to the purpose at hand, which is to succinctly describe Iraq, with special emphasis on the areas important to military planning.

The regional analysis presented here will cover Iraq's location, geomorphology, climatology, biogeography, historical geography, political geography, economic geography, population

Figure 1.1 The Scope of Regional Geography
Source: de Blij and Muller, 2001



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and urban characteristics, and medical geography. It is appropriate to devote a few sentences to explain the relevance of each of these to the overall purpose of the book. Hopefully this will help answer the "Why?" or "So what?" of the material presented. Every discussion of a country's geography must begin with a description of place, both in absolute terms as well as its location relative to other places. Geomorphology, climatology, and biogeography are subfields that help explain many important mission planning concerns. Movement by land and air is greatly impacted by the terrain, which is directly related to the physical geography sub-disciplines just mentioned. Historical and political geography provide context and are important elements assisting the military planner in appreciating the nature of the problem at hand. Economic geography helps understand why and how a population sustains itself, which often times is a crucial factor in the planning process. Without the ability to become self-sufficient in assuring basic human needs, achieving a stable end state is impossible. Population must also be discussed. The number of people is straightforward, but there are other important issues. "How are they spatially distributed?", "Are there different groups of people within the larger population?", and "Is the population young, or is it aging?" are examples of important population questions that military planners should ask. Lastly, medical geography is important for several reasons. The subfield helps to identify the health risks to troops who may be deployed to an area. It defines the medical protections, such as immunizations, which are important. Second, it describes the health of the local population, which must be considered to reach a stable condition or end state. Finally, it is necessary to plan the military medical support for any operation.

Overall, it should be clear that geography provides essential information for the military planner and strategist. It facilitates looking at an unfamiliar location or region and comparing it to familiar places with similar characteristics. For example, the climate of Iraq is similar to parts of the American Southwest.

This department was honored to present the Army with a similar book, "*Afghanistan: A Regional Geography*". That book was developed to support the military personnel conducting anti-terrorism operations in that country. Because those units found it helpful, the Department of Geography and Environmental Engineering at the United States Military Academy now offers this book on Iraq to all who require geographic information as the United States continues its planning and execution of the war on terrorism. This book is presented in honor of America's soldiers, sailors, airman, and marines serving today to restore peace and

security in the world.

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2
Location

MAJ Wiley C Thompson

Key Points:

- To understand Iraq's geography, it is first vital to appreciate its absolute and relative location
- Iraq shares borders with six countries and has only a small coastline
- Iraq is four times the size of Tennessee or about twice the size of Idaho

One of the keys to understanding the importance and complexity of Iraq and its role in current events lies in its location. As geographers seek to answer the question of "where" in their regional analysis, they examine the concept of location in two ways. The first way to examine a region is in terms of its absolute location. Absolute location refers to the exact position of a place on the surface of the earth. One often sees absolute location expressed in terms of latitude and longitude or some other coordinate system. The geographic center of Iraq lies at approximately 33° North latitude, about the same as Tennessee, and 44° East longitude (Fig 2.1).

The north-south extents of Iraq's borders run from 37° 21' N in the Kurdistan region along its northern border with Turkey to 29° 04' N along its southern border with Saudi Arabia. Iraq's east-west extent spans from 38° 56' in the Syrian Desert to 48° 36' in the vicinity of the Shatt al Arab (Fig 2.2). Two significant lines of latitude are the 36th parallel no-fly zone in the north, imposed to protect the Kurdish people and the 33rd parallel (extended from the original 32nd parallel) no-fly zone in southern Iraq, enacted to protect the Shi'a Muslims. Iraq is a fairly compact country, as its geographic center is relatively equidistant

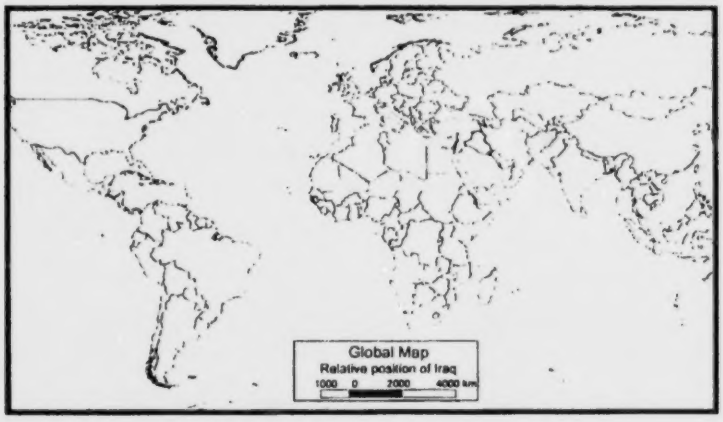
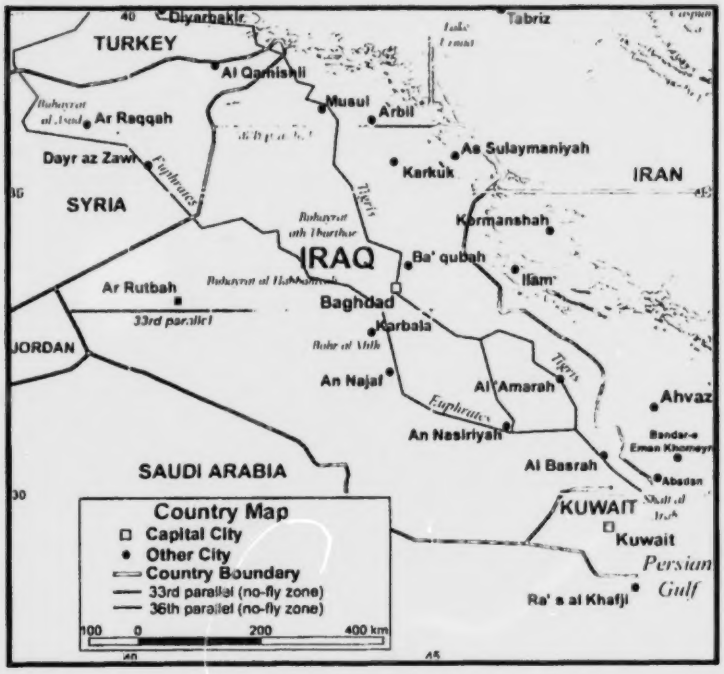


Figure 2.1 Relative Position of Iraq
Source: Author

Figure 2.2 Map of Iraq
Source: Author



from its borders. The entire country is located within the + 3:00 time zone and is 8 hours ahead of Eastern Standard Time.

What does Iraq's position on the globe mean to the soldier deploying to Iraq on a C-17? It means that to reach the capital of Iraq, Baghdad, a soldier deploying from Ft Drum, NY must cover 9538 kilometers. A non-stop flight, direct flight eastward would take approximately twelve hours. A soldier deploying non-stop from Ft Lewis, WA to Baghdad would cover 10,994 kilometers during his twelve and one-half hour flight traveling west.

Relative Location

Another method in which a geographer answers the question of "where" is through the concept of relative location. Relative location describes the location of a place relative to the

Figure 2.3 Iraq in the Region
Source: Author

Figure 2.4 Size Comparison of Iraq to the United States
Source: Author

position of other places and things. The relative location perspective is affected by distance and accessibility to other resources and influences within the larger region or realm. The relative location of a region is a key element in the geographer's analysis of the historical, cultural, political, and economic geography of a region. As such, only a cursory introduction to Iraq's relative location will be given now, saving the critical analysis for later chapters.

Iraq is a southwest Asian country that is bordered by Syria and Jordan to the west, Turkey to the north, Iran to the east and by Saudi Arabia and Kuwait to the south (Fig 2.3). Iraq's only access for maritime traffic comes from the Shatt Al Arab.

With an area of 437,065 km², Iraq is four times the size of Tennessee and at about the same latitude (Fig 2.4). The country has high, rugged mountains along its border with Iran and Turkey. Haji Ibrahim, along the Iran – Iraq border is the highest

point in Iraq at 3,607 meters. Iraq's elevation tapers to the south and west as it transitions through the fertile Tigris and Euphrates basins to the Syrian Desert and the red sand deserts of the An Nafud in northern Saudi Arabia. The rugged mountains of southern Turkey and northern Iraq are home to the Kurdish people. The mountains on Iraq's eastern border with Iran are home to the Shi'a Muslims. The satellite image in Figure 2.5 provides a sense of the dramatic transition from desert plains to rugged mountains along the Iran-Iraq border. The proximity of other religious and ethnic groups can undoubtedly be viewed as a centrifugal or dividing force within the country.

The concepts of absolute and relative location are key to geographer's analysis and understanding of a region. These concepts can and will be applied to the various themes or geographic subfields as the authors focus on how the people have interacted with their neighbors and the surrounding environment. It is through this framework that the geographer can better explain the physical and human geography of Iraq.

Figure 2.5 Satellite Image of Mesopotamia
Source: NASA

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3
Geomorphology

CPT Matt R Sampson

Key Points:

- Iraq has four major physiographic regions, including desert, uplands, highlands, and an alluvial plain
- Deserts cover over 40% of Iraq's area, especially in the western and southern parts of the country
- The Tigris and Euphrates Rivers are the lifeblood of Iraq and are vital to human populations and agricultural activity

Geomorphology is the study of landforms and the processes that shape them. It entails understanding the terrain, or the lay of the land, and how it got that way. The geomorphic processes that shape the earth's surface include weathering and erosion. The former breaks down surface materials either by physical or chemical means. The latter refers to the movement of weathered surface material by wave action, running water, wind, or glacial ice. The result is a dynamic landscape that is continually being reshaped by the forces of nature. Depending on the dominant geomorphic forces at work, distinct physical landscapes will result. If running water is the dominant force for example, it would create specific landforms such as river valleys, alluvial fans, and deltas. Geographers often categorize these distinct landscapes into geographic regions.

Geographic Regions

While the territory of Iraq consists primarily of lowlands that seldom exceed 300m in elevation ("Iraq Land & Climate", 2002), the country can be divided into four major geographic

Figure 3.1 Shaded Relief Map of Iraq
Source: *CIA World Factbook*, 2001

regions: desert in the west and southwest; rolling uplands between the Euphrates and Tigris rivers; highlands in the north and northeast; and alluvial plain in the central and southern sections (Library of Congress, 1988).

Desert

West of the Euphrates lies a vast extension of the Syrian Desert that covers parts of Syria, Jordan, and Saudi Arabia beyond Iraq's borders. In the desert, known as Wadiyah, stony plains give way to islands of sand. Elevations reach to over 1,500

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feet in some areas. Western deserts are furrowed with numerous *wadis*, normally dry riverbeds that direct occasional rainfall east towards the Euphrates (Held, 2000). Wadis, which can stretch to over 400 km in length, usually have steep banks that can be hazardous during cross-country movement, particularly during times of limited visibility. Driving over the edge of a wadi can easily cause a vehicle rollover. Over the years, such incidents have caused several soldier deaths at the National Training Center at Fort Irwin, California.

The deserts of southern Iraq are generally divided into the al-Hijarah in the western area and al-Dibdibah in eastern sections. The al-Hajarah Desert is rough, uneven limestone plateau cut by wadis and depressions and strewn with loose flint and chert, a flint-like quartz. The al-Dibdibah is more sandy and gravelly than the al-Hajarah. A dominant feature of the al-Dibdibah is the Wadi al-Batin which runs along the Iraqi border with Kuwait. West of the Wadi al-Batin is a flat open stretch of desert utilized by coalition forces in February 1991 to outflank Iraqi troops (Held, 2000).

Al Jazirah

North of the Tigris city of Samarra and the Euphrates city of Hit is an uplands region known as the al Jazirah, or the "island" (Library of Congress, 1988). This area is a desert plateau that extends into Syria. The wadi Tharthar is the main source of drainage for the region, running into the large Tharthar Depression, which has been improved over the years to include a large artificial lake that can accept floodwaters from the Tigris if necessary (Held, 2000).

Highlands

In northern Iraq, highlands give way to mountains that rise to over 11,000 feet (3,600 meters) near the Turkish and Iranian borders. Iraq's highest point is Haji Ibrahim, located on the Iranian border.

In general, the highland ridges in the north extend east-west, which follows the folds in the Taurus and Anti-Taurus mountains in neighboring Turkey. In the northeast these folds turn towards the southeast as part of the mighty Zagros mountains that lie mainly across the border in Iran. These highlands are natural headwaters for streams such as the Khabur, Great and Little Zab, Udhaym, and Diyala that flow west to join the Tigris in its journey south. Much of these highland areas are still

remote and relatively inaccessible. Few passes cross the Zagros,but notable gaps include the Spilak Pass in the Ruwanduz River gorge, the Ali Beg Gorge west of the Ruwanduz, and the Shinak Pass (Held, 2000).

Alluvial Fan

The alluvial plain begins north of Baghdad and extends to the Persian Gulf. Over the centuries, silt from the Tigris, Euphrates, and other rivers was deposited in their deltas. With time, the delta areas grew southward, and today much of southern Iraq is composed of the sand from eons of deposition.

This area is generally low and flat, ranging from about 75 feet to below sea level in some areas (Held, 2000, 337). Channels of the Tigris and Euphrates, and irrigation canals cut across the area. During times of flooding lakes and large muddy areas can also be found in this region. Near the confluence of the Tigris and Euphrates at Al Qurnah is a marshland known as the Hawr al Hammar which historically extended eastward into Iran (Library of Congress, 1988).

In 1992, nominally to improve drainage in this area, the Iraqi government engineered a 563km artificial river known as the Main Outfall Drain (MOD) (Figure 3.2). "Sometimes termed the Third River, the MOD is designed to drain both the central marshes and the southern marsh homeland of the Mandan" (Held, 2000). The Mandan, or "Marsh Arabs", mostly Shiite Muslims, are seen as a threat by the Hussein government. As the marshes have dried up, thousands of Marsh Arabs have fled to ethnically similar areas in Iran. Figure 3.3 illustrates marsh decline over the past three decades.

High salinity levels in the soil are also an issue in this area. In addition to salts naturally found in the Tigris and Euphrates, irrigation schemes and poor agricultural practices can cause elevated salt levels in the soil. A high water table and poor surface drainage complicate the problem. In general, soil salinity increases south of Baghdad to the Persian Gulf and severely limits agriculture in the region south of Al Amarah. A large, usually dry lake southwest of Baghdad, known as the Bahr al Milh, or Sea of Salt, is indicative of the salinity in the alluvial plain (Library of Congress, 1988).

Rivers

Rising in Turkey, the Euphrates is joined by the Nahr River in Syria before crossing into Iraq. The Tigris also begins in

Figure 3.2 Hydrology in Southeastern Iraq, June 1994
Source: *CIA World Factbook*, 2001

Turkey, but is significantly augmented by several rivers above and one below Baghdad. The two rivers meet at Al Qurnah. Below their confluence, both rivers break into many smaller channels and drain into marshlands in the area. As mentioned, large amounts of silt are deposited here. The rivers drain into the Shatt al Arab, which is repeatedly filling with silt from the Karun River that enters from Iran. This silting problem affects the navigation of ocean-going ships attempting to reach the port of Basra(Library of Congress, 1988).

Although these mighty and historic rivers bring life to Iraqis, they historically have also brought death and hardship in the form of flooding. Before the 1980s, March, April, and May often saw a forty-fold increase in river volumes, but Turkish and Syrian dams and diversion projects have greatly reduced the amount of water entering Iraq. September and October are the months when the rivers at their lowest.

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Geology

The Middle East is a particularly complex region geologically (Beaumont, Blake, and Wagstaff, 1988). In terms of plate tectonics, northeastern Iraq and western Iran is an area where a convergent boundary (i.e. plates coming together) exists between the Arabian plate and the Eurasian plate (*Goode's World Atlas* 2001). Both plates consist of continental crust, and the northward movement of Arabia towards Eurasia has produced widespread overthrusting and folding (Beaumont, Blake, and Wagstaff, 1988). "The result is a continuous band of folded and faulted mountains from western and eastern Anatolia and then southeastward across Iran and eastward into the Himalayas. This belt makes Turkey, northeastern Iraq, and Iran structurally extraordinarily complex" (Held, 2000). This convergent zone also causes earthquakes, which in Iraq are almost entirely in the northeast region. But in addition to the dangers of earthquakes, Iraq's geology has also blessed it with petroleum resources. Almost all early finds of oil were made in the sedimentary basins where the Zagros Mountains meet the plains (Beaumont, Blake, and Wagstaff, 1988). Oil will be discussed in greater depths in the "Economic Geography" chapter later in this volume.

Soils

As expected, desert soils are common in Iraq. These light gray or brown soils have low levels of organic matter and overlie limestone and other calcium-containing rock. Although these soils normally support only shrubby desert plants, cultivation can be successful when irrigation is present (Held, 2000).

In areas watered by the Tigris and Euphrates fertile alluvial soils can be found. But, as mentioned above, salinity from excessive irrigation and inadequate drainage have damaged the fertility of the region. Most plants are salt-intolerant and will not grow if the salt concentration in the soil gets too high. Consequently, salinization can have a devastating effect on agricultural production.

Summary

Iraq is mainly a low-lying country with a small area of high relief in the northeast. The western third of Iraq consists of desert terrain dissected by wadis, but the principal geomorphic feature of Iraq is the alluvial plain formed by the Tigris and Euphrates rivers. These rivers and their sediment have shaped the

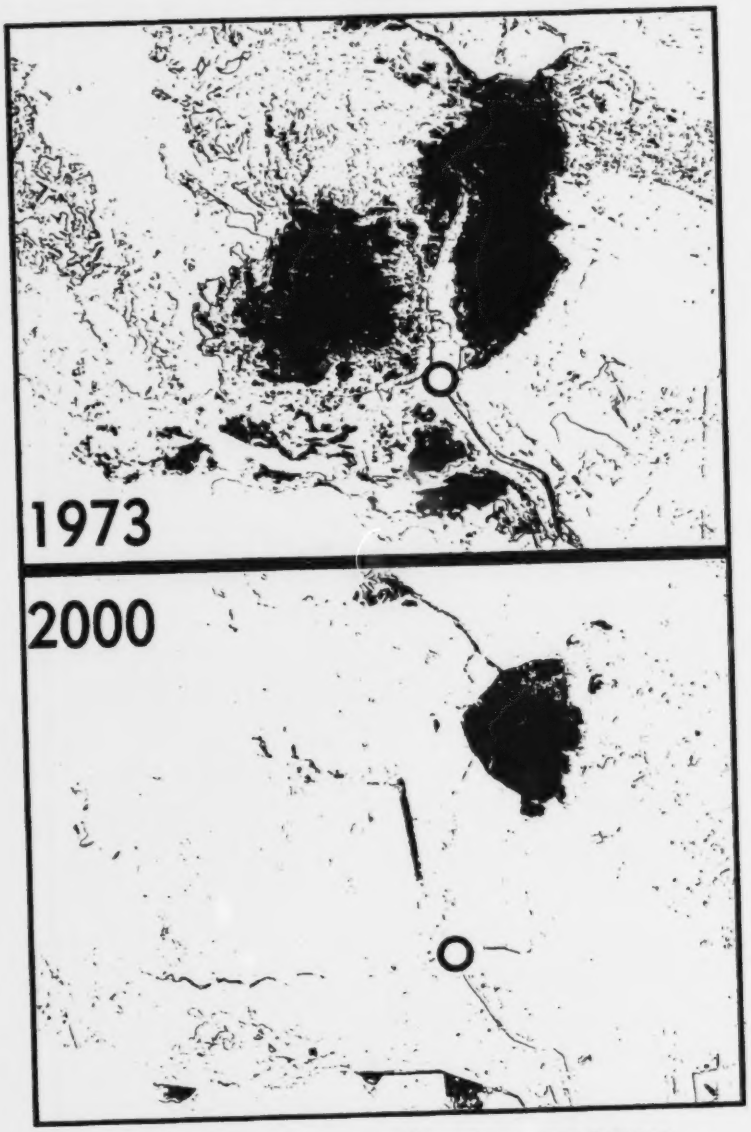

Figure 3.3 Marsh Decline in Southern Iraq, 1973 & 2000
Note: Red areas indicate vegetation
Source: NASA

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land and life of Iraq since ancient times, and they continue to do so today. Arguably, the Tigris and Euphrates are Iraq's most important resource, providing precious water and fertile soil. In an arid region such as Iraq, water is life; consequently, the Tigris and Euphrates are the life-blood of the country.

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4
Climate

MAJ Richard P Pannell

Key Points:

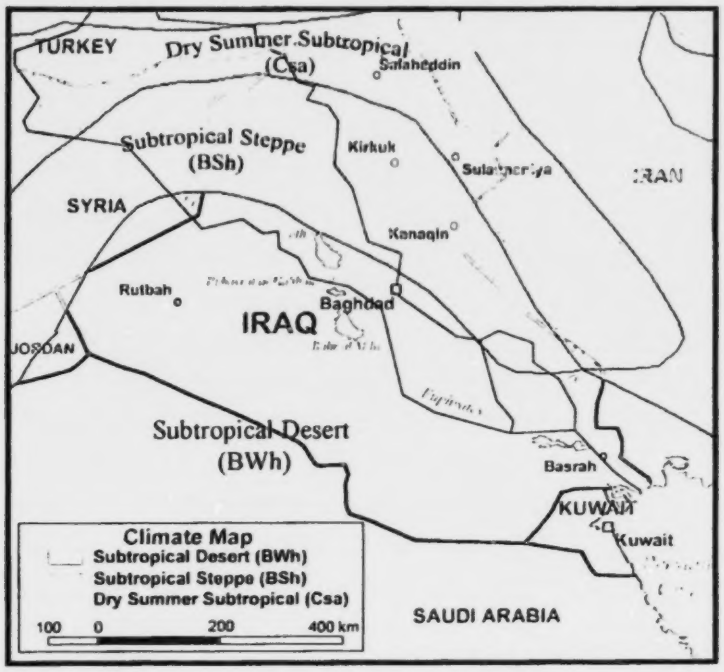
- Iraq consists of three distinct climatic zones: subtropical desert, subtropical steppe, and dry summer subtropical
- Iraq's deserts are extremely hot and dry in the summer and cool and dry in the winter
- Precipitation is limited, with even the wettest areas getting less than 30 inches per year
- Cold is a significant hazard in the northern mountains
- Sand and dust storms are common, especially in the deserts
- Spring flooding is a real hazard in many areas

The climate of Iraq must be characterized with some care. On the one hand it is simplistically predictable: summers are almost guaranteed to be very hot and extremely dry while winters are typically characterized by mild to cool temperatures with precipitation commonplace. Yet the potential for a variety of climatic or weather hazards such as drought, sandstorms and floods makes the reliance on short and long-term forecasts problematic. This analysis will examine three major climate regions as well as the potential for hazardous atmospheric and hydrologic phenomenon.

Because of its location between 29° and 37° north latitude, Iraq is strongly influenced in the summer by subtropical high pressure. This high pressure zone influences desert regions across North Africa and the Arabian peninsula and migrates northward in the summer because of increased solar radiation associated with the summer solstice. By contrast, during the winter solstice, as the northern hemisphere is tilted away from the sun, the subtropical high pressure is replaced by periodic low pressure systems that travel from west to east across Iraq bringing winter rains and snow in the mountain regions of the north.

These annual migrations of subtropical high pressure and mid-latitude low pressure are clearly reflected in Iraq's climate and three distinct climate regions result when classified using the Köppen climate classification scheme (Goode's, 2000). The southern half of Iraq from the coastal areas near Basrah to the Syrian Desert is closest to the subtropical high pressure zone and consequently is classified as a Subtropical Desert (BWh). The upland region north of Baghdad is significantly wetter, particularly in winter, and can be classified as a Subtropical Steppe (BSh). Finally, in the northern mountain regions, where conditions are much cooler and rainfall more abundant, the climate is Mediterranean or Dry Summer Subtropical (Csa). The climate map (Figure 4.1) outlines these three regions and each will be discussed in greater detail below.

Figure 4.1 Regional Köppen climate classification of Iraq
Source: Basemap after Thompson, 2002; Climate data from Air Force Combat Climatology Center, 2001.



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Southern Iraqi Desert

The arid landscape from the edges of the Syrian Desert in western Iraq to the coastal lowlands in the southeast is inhospitable to say the least. This Subtropical Desert climate (BWh) is primarily controlled by the extended presence of high pressure throughout the year. This results in only small amounts of precipitation during the winter months when the high pressure is occasionally displaced southward. Temperatures are extremely hot in the summer and mild in the winter due to variability of incoming solar radiation (insolation) caused by the tilt of Earth's axis. This annual variability can be clearly seen in the climographs of Baghdad, Basrah, and Rutbah (Figure 4.2). These graphs do not show the entire story, however, as mean daily maximum temperatures are typically 110°F during the summer months and mean daily minimum temperatures are in the 40s°F during winter. In addition to the variability of insolation in Iraq, the location of the country astride the African and Asian landmass results in a continental influence indicated by broad annual as well as daily (diurnal) temperature ranges. This continentality is primarily manifested through the rapid heating and cooling of the land surface due to its relatively low specific heat (McKnight, 2002). In other words, the land heats up quickly and cools down fast when compared to the oceans.

The other important climatic variable in this region is the wind (see section on hazards below). The dominant wind pattern for most of Iraq is the *shamal* (Arabic for "north"). Throughout the year, winds from the north and northwest bring very dry air across the country inhibiting cloud development and thus precipitation. Average daily wind speeds are in excess of 10 knots during summer months causing frequent dust and sand storms, while winter conditions often generate faster winds though less frequently (AFCCC, 1997). In the early summer and early winter a different wind system, the *sharki* (Arabic for "east"), may occasionally blow from the south or southeast. June is typically the worst month for this type of activity due to the combined frequency of shamals and sharkis in central Iraq.

Despite the lack of moisture, much of this region is farmed, particularly in the lowland regions adjacent to the Tigris and Euphrates Rivers where annual flooding has created rich alluvial soils. Despite the arid conditions, irrigation canals and water diversion projects have allowed the people of the region to farm this land for millennia. However, the potential for long-term drought is greatest here, and as recently as 1999 to 2000 this region experienced a hundred year drought (NOAA, 2000).

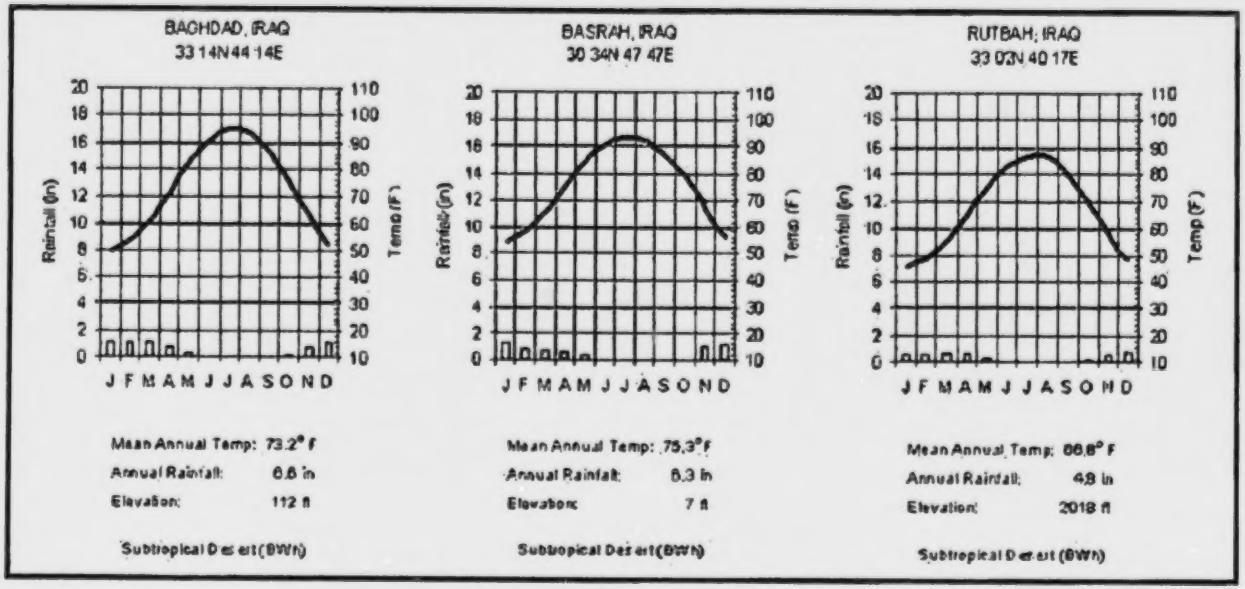
BAGHDAD, IRAQ
33 14N 44 14E
Rainfall (in)
Temp (F)
J F M A M J J A S O N D
Mean Annual Temp: 73.2° F
Annual Rainfall: 6.6 in
Elevation: 112 ft
Subtropical Desert (BWh)
BASRAH, IRAQ
30 34N 47 47E
Rainfall (in)
Temp (F)
J F M A M J J A S O N D
Mean Annual Temp: 75.3° F
Annual Rainfall: 6.3 in
Elevation: 7 ft
Subtropical Desert (BWh)
RUTBAH, IRAQ
33 02N 40 17E
Rainfall (in)
Temp (F)
J F M A M J J A S O N D
Mean Annual Temp: 66.8° F
Annual Rainfall: 4.9 in
Elevation: 2018 ft
Subtropical Desert (BWh)

Figure 4.2 Köppen climographs for Baghdad, Basrah and Rutbah
Source: Data from Air Force Combat Climatology Center, OCDS, 1995

Iraqi Uplands

North of the Tigris and Euphrates river valley, the landscape rises gently towards the foothills of the Zagros Mountains. This region of Iraq is only slightly cooler but significantly wetter, resulting in its classification as a Subtropical Steppe (BSh). Summer temperatures are still extreme while winter temperatures are slightly cooler. The continental influence is greater here, affecting both annual and diurnal temperature ranges. Average annual temperature ranges are close to 50°F while average daily temperature ranges are between 20° and 30°F (AFCCC, 1997). Once again, the migrating pressure patterns result in dry, high pressure dominating during the summer months and wetter, low pressure systems occurring more frequently in the winter. Figure 4.3 shows climographs for two climate stations in this region: Kanaqin and Kirkuk.

Increased moisture in this region promote grassland and shrub form vegetation and the development of organically rich soils suitable for agriculture. Likewise, the increased potential for precipitation makes flash flooding a potential hazard, particularly when thunderstorms can produce two to three inches of rain in less than 24 hours. The potential dangers of flash flooding are greatest in wadi bottoms where flows are quickly concentrated and soil conditions may be transformed into a type of quicksand for up to 24 hours (AFCCC, 1996).

The Northern Mountains

The final climate region of Iraq is the northern mountains where conditions are much different than the rest of the country. Because of the cooler temperatures and increased precipitation, this region is classified as a Mediterranean or dry summer subtropical climate (Csa). Higher elevations in this area result in significantly cooler temperatures. Temperature differences between summer and winter are great here because it is far from the moderating effects of the ocean. In winter, temperatures are often below freezing and snow is common at altitudes above 3500 feet with a thick snow pack in place above 5000 feet (AFCCC, 1997). The annual rainfall for most of this region is in excess of 25 inches. In the winter, precipitation is caused by migrating low pressure systems from the Mediterranean Sea as they track across northern Iraq and rise over the mountains. The result is heavy rain or storm activity during the winter and spring with precipitation being common from November through May. This pattern is shown in the climographs of Salahaddin and Su-

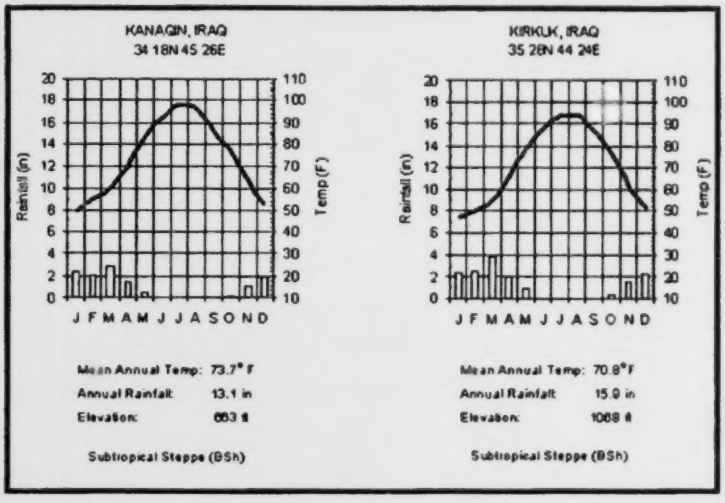
KANAQIN, IRAQ
34 18N 45 26E
Rainfall (in)
Temp (F)
J F M A M J J A S O N D
Mean Annual Temp: 73.7° F
Annual Rainfall: 13.1 in
Elevation: 653 ft
Subtropical Steppe (BSh)
KIRKUK, IRAQ
35 28N 44 24E
Rainfall (in)
Temp (F)
J F M A M J J A S O N D
Mean Annual Temp: 70.8°F
Annual Rainfall: 15.9 in
Elevation: 1068 ft
Subtropical Steppe (BSh)

Figure 4.3 Climographs for Kanaqin and Kirkuk
Source: Data from Air Force Combat Climatology Center, OCDS, 1997

laimaniya below in Figure 4.4.

The primary climate hazards in this region are related to the cold, wet conditions in winter. High mountain regions may be impassable due to snow pack and roads are often icy and foggy. Snowstorms generated from cool moist Mediterranean air may develop with little warning, affecting vehicular movement and personal comfort. Rapid, unexpected temperature changes make hypothermia and frost bite a potential problem. Downslope winds called föehns are also a hazard and may strike without warning with wind gusts in excess of 50 knots (AFCCC, 1997).

Climate and Weather Hazards

Associated with the three general climate regions are several natural hazards that occur on a variety of timescales. Over longer periods of time, such as a 10 year timescale, conditions such as drought may be a significant anomaly to the normal climate regime. At the annual timescale, snowmelt and frontal activity influence large-scale flooding while pressure patterns influence prevailing wind conditions. At the seasonal or even daily timescale, wind systems are generated that produce sandstorms and thunderstorm activity capable of causing rapid, violent flash flooding. Because these hazards have a significant impact on a

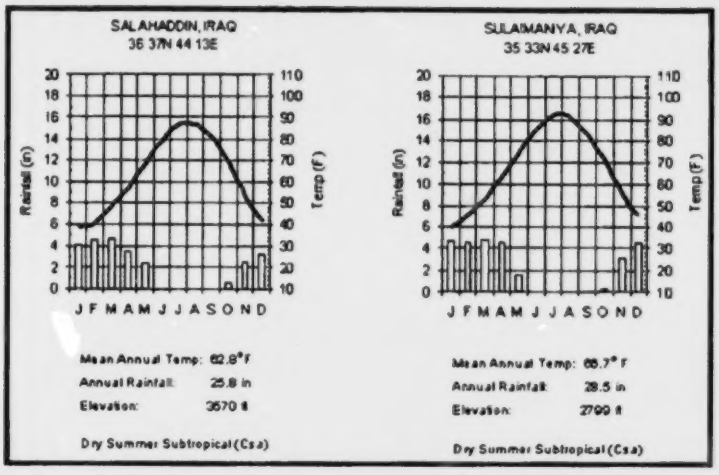
SALAHADDIN, IRAQ
36 37N 44 13E
Rainfall (in)
Temp (F)
J F M A M J J A S O N D
Mean Annual Temp: 62.8° F
Annual Rainfall: 25.8 in
Elevation: 3570 ft
Dry Summer Subtropical (Csa)
SULAIMANYA, IRAQ
35 33N 45 27E
Rainfall (in)
Temp (F)
J F M A M J J A S O N D
Mean Annual Temp: 68.7° F
Annual Rainfall: 28.5 in
Elevation: 2799 ft
Dry Summer Subtropical (Csa)

Figure 4.4 Climographs for Salahaddin and Sulaimaniya
Source: Data from Air Force Combat Climatology Center, OCDS, 1997

variety of military and non-military operations, a closer analysis of three main atmospheric and hydrologic hazards is included below.

Drought

The importance of water for agriculture cannot be overemphasized in Iraq. Drought conditions affect not only the potential for rain-fed agriculture, but also alter the hydrologic conditions of the Tigris-Euphrates river system which is heavily relied on for irrigation. The occurrence of drought is related closely to two pressure systems: migrating low pressure systems from Europe and the strength of Siberian high pressure systems during the winter months. Droughts occur as the result of decreased precipitation in the winter and spring which in turn is linked to the strength of Siberian high pressure. The stronger the Siberian high, the more likely westerly low-pressure systems will be blocked from reaching the interior of Iraq. In addition, warmer surface temperatures evaporate much of the available surface water, exacerbating conditions.

During the last 20 years, numerous droughts have occurred in Iraq including droughts in 1984, 1990 and most recently in 1999/2000. While conditions have improved recently due to increased precipitation, the potential for drought remains

a significant climatological concern for the people of Iraq, particularly in the arid regions of the southern half of the country.

Flooding

Flooding is a potential hazard on two different timescales. Every year, flooding of the Tigris-Euphrates river valley can be expected during the spring because of snowmelt and increased precipitation. The magnitude of these floods is related to the amount of snowpack in the Northern Highlands as well as the intensity and duration of spring precipitation in the northern half of the country. Timing of this event varies, but can be relied upon to occur in March or April which are the wettest months. River depths can be in excess of 20 feet across the floodplain while velocity is relatively slow at about two knots (AFCCC, 1996).

At much shorter timescales, the potential for flash flooding is a separate hazard that occurs primarily in winter and spring, but is more unpredictable. Thunderstorms though uncommon can result in brief, intense rainfall events. Because surface conditions are largely unvegetated, runoff quickly moves through the drainage system creating high discharges in wadis. These flash floods may occur almost anywhere, but typically last only a few hours.

Sandstorms

The presence of poor dry soils combined with continuous winds during most of the year make the potential for dust and sandstorms an important hazard to consider. This is especially important in the southern deserts where vegetative cover is at a minimum and the supply of silt and sand is relatively abundant. However, even in more humid regions adjacent to the Tigris and Euphrates Rivers, this is becoming a problem due to poor irrigation practices leading to desertification.

As previously discussed, most of Iraq is dominated by the shamal. This steady wind blows throughout the country from about eight to ten knots on average, but is capable of much faster gusts, when wind speeds can exceed 50 knots locally. The shamal is strongest in the winter and the Air Force Combat Climatology Center (AFCCC) refers to two different winter shamals: the 24-36 hour shamal and the 3-5 day shamal. The 24-36 shamal is associated with the passage of a front and is characterized by fast winds (25-30 knots) immediately behind the front, blowing from the north or northwest. These winds are capable of generating dust and sandstorms and are relatively common, occurring two

or three times a month during the winter season (AFCCC, 1996). The three to five day shamal on the other hand is not associated with frontal passage but rather the stalling of pressure systems over the Straights of Hormuz which causes an increased pressure gradient between high pressure from the north and low pressure over the Persian Gulf. These systems are much more intense but occur less frequently arising only a couple of times during the entire winter season. It is from these shamals that the strongest sandstorms are generated with sustained winds of 25 knots for several days (AFCCC, 1996).

During the transition months in early summer and early winter, another type of wind from the south or southeast called the sharki. This wind is also associated with the passage of low pressure systems; however, it is derived from warm, dry air moving ahead of the front. These winds originate from a continental tropical air mass over the Arabian Peninsula and are similar to the Santa Anna winds of the Southwest United States. In Iraq they promote the desiccation of land and wilting of plant life (Held, 2000). This wind is particularly common in June, when continental air is gaining strength but migrating low pressure systems are still possible.

Summary

Iraq's climate displays clear latitudinal zonation which can be related directly to migratory surface pressure zones. The southern half of Iraq is essentially a vast Subtropical Desert region across its entire east west expanse. Conditions become more moist from south to north as the potential for migrating low pressure cyclonic activity increases. This results in a Subtropical Steppe environment in the uplands north of the capital city, Baghdad. Finally, in the higher elevations in the northernmost reaches of the country a longer wet season occurs due to increased frontal activity and orographic uplift. Cooler temperatures prevail due to altitude and the region is a mild, humid Mediterranean climate with a dry summer season.

Despite these distinct climate zones a variety of environmental hazards associated with anomalous climate and weather patterns result in droughts, floods and sandstorms. The long-term variability in moisture conditions can result in periods of extended drought like the one Iraq faced during 1999/2000. On an annual timescale, floods associated with spring rains and snowmelt in the northern highlands results in large scale flooding of the Tigris and Euphrates river basins of central Iraq. While on a shorter timescale thunderstorm activity can create flash floods

in wadis. Finally, periodic and seasonal wind patterns create two wind patterns, the shamal and the sharki, both capable of generating dust and sandstorms lasting hours to days.

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5
Vegetation &Soils

Peter G Anderson, PhD

Key Points:

- Iraq is primarily devoid of natural vegetation
- Minor forest resources, already significantly impacted by human activity, exist in the northern mountains
- The most unique natural biome in Iraq is the marshland area of the lower Tigris and Euphrates, but this area is rapidly being destroyed by Iraqi government policies to reduce populations in the region

The natural vegetation of Iraq consists of two potentials: little to none and altered by human activities. Roughly 74% of the land area exhibits a medium to high degree of human disturbance (Animal Info, 1999). The "gift of life" brought to Iraq via the Tigris and Euphrates Rivers influences an extensive area. The water of these rivers has been captured and used for millennia and the natural ecosystems of the river landscape has been altered repeatedly. Rainfall throughout Iraq is minimal and deserts are common in western, southwestern, and southern Iraq; little grows in these regions. Although rainfall of the mountains in the north is sufficient for forest development, the spatial extent of this area in Iraq is small. Iraq may be blessed with warmth and petroleum, but the country is depauperate in natural vegetation and ecological diversity. About one-third of the country is desert, one-third is grass and shrub, and one-third is cropland and settlements (Animal Info, 1999).

Soils

Much of Iraq is arid to semi-arid, receiving less than 12

inches of rainfall per year. Centuries of human use have altered Iraq's ground cover and soils. These factors contribute to poor soil quality in Iraq, affecting agricultural potential. The only soils with a satisfactory potential for agricultural production occur in the Tigris and Euphrates lowlands. Soils of this region may have abundant clay, humus, and ground water, creating a rich soil for agriculture (Animal Info, 1999). Flood control and irrigation canals direct water to where human interests want and will use the water. Unfortunately, decades and centuries of topsoil loss has degraded Iraq's good soils, while dams on the rivers have altered spring floods that once replenished floodplain environments.

Vegetation Regions

Northern Mountains

Northern Iraq consists of hilly to mountainous terrain. Elevations rise to greater than 6,000 feet near the Turkish border. Along the Iranian border, peaks greater than 10,000 feet may be found, such as Mount Halgurd at 12,249 feet ("Kudistan", 1992) and Mount Ebrahim at 11,834 feet (Microsoft, 2002). The spatial extent of this region in Iraq is relatively small, confined to areas near the borders of Turkey and Iran. In this highland area, four seasons are encountered, with cool dry summers and cold snowy winters possible. Rainfall in the northern highlands occurs from October to May, ranging from 12 to 22 inches (Microsoft, 2002). Spring melt of the winter snows feeds the Tigris and Euphrates Rivers and their tributaries, such as the Great Zab, little Zab, and the Diyala.

Eight to ten thousand years before the present, the highlands region was heavily forested with cedar, pine, juniper, ash, poplar, sycamore, chestnut, and oak (Izady, 1997). Due to climate change and centuries of human use, oak is the only predominant tree of the region today ("Kurdish Land", 2002). The loss of a protective vegetative cover has contributed to increased soil erosion and local climate change, i.e., the moist microclimate of a shaded woodland is now a dry landscape. Although all of the vegetation in the highlands region of Iraq has experienced some degree of human use and alteration, the pasture lands remain in reasonably good condition, and nomadic herding and subsistence agriculture is a prevalent economic livelihood in the region ("Kurdish Land", 2002).

Southern Deserts

Whereas Iraq's northern mountainous region is a small area, lowlands (>2,000 feet) and aridity dominate most of the country. Lands less than 1,000 feet can be found in the Tigris and Euphrates Rivers basin. These rivers flow northwest to southeast. Lands north and south of the river valleys are hot, dry deserts. Iraq's southern and western lands, contiguous with Saudi Arabia, Jordan, and part of the Syria, coincide with the Syrian Desert. The environment here may be best described as bleak. Broad plains of sand and dust storms are the result of long hot dry summers and short cool winters (Microsoft, 2002). During summer, daytime temperatures in the Syrian Desert may exceed 120°F, while nights may cool to less than 50°F. Little or no precipitation falls. This combination creates an environment where plant growth and vegetation development is minimal to nonexistent. Without irrigation, the desert is not arable and only sparse cattle and camels are raised by nomadic herders (Microsoft, 2002).

Central Lowlands

Iraq's central lowlands, the historical "Mesopotamia", formed the eastern end of the "Fertile Crescent." In warm weather with good soils and copious ground water, abundant plant growth occurred there. The lowlands persist, but the rivers have been harnessed for flood control, hydro-power, and irrigation purposes. As ground water has been altered, soils have degraded and agriculture has replaced the natural vegetation and ecosystems. Although these activities are contributing to increased agricultural productivity, this once verdant natural area is diminishing in size and quality (Animal Info, 1999), .

The central lowlands, i.e., the Tigris and Euphrates river valleys and floodplains, consist of an upper and lower section. The upper section is centered on Baghdad, whereas the lower section encompasses lands of the southeast, a once extensive marshland region. Unfortunately, as with marshes and swamps the world over, this biologically productive habitat is rapidly disappearing at the hands of Iraqi government policies. As the wetlands disappear, so to does the plant and animal life of the region (see Figure 3.3).

The once thriving wetland of this area included freshwater swamps and marshes of the Tigris and Euphrates Rivers, the Shatt al Arab, and the delta coast marshes of the northern Persian Gulf.

> This complex of shallow freshwater lakes, swamps, marshes, and seasonally inundated plains between the Tigris and Euphrates rivers is among the most important wintering areas for migratory birds in Eurasia. Of the 278 species of birds that have been recorded in the lower Mesopotamia, 134 species are dependent to some extent on the wetland habitats. These marshes support almost the entire world population of two bird species, Basra reed warbler (Acrocephalus griseldis) and Iraq babbler (Turdoides altirostris) (WWF "Global, 200", 2002).

Unfortunately, these wetland areas are rapidly diminishing and may have been degraded to such a degree, by stream channelization, irrigation withdrawals, chemical contamination, agricultural, industrial, and residential pollution, and drainage for conversion to other land uses, as to cease to function as a natural ecosystem (Izady, 1997; WWF "Wetlands", 2002). Salinization is also a problem because of increased salt accumulation caused by the flushing of salts from agricultural lands (WWF "Wetlands", 2002; USGS, 2001).

In the wetlands of lower Mesopotamia, recent military activity has contributed to the loss of plants and animals, as well as human inhabitants ("WWF: Wetlands", 2002). "Much of the fighting during the prolonged Iran-Iraq War (1980-1988) and bombings during the Persian Gulf War occurred in and around the wetlands and caused considerable damage to the marsh ecosystems (WWF "Global 200", 2002)." Additionally, the marshes may have been purposefully drained as part of the "attempted elimination" of political opposition to the Iraqi government (USGS, 2001). The net effect of these activities is the loss of one Southwest Asia's most productive wetland ecosystems.

Conclusion

Approximately one-half of Iraq may be considered arid to semi-arid lands with little to no vegetation and sparse animal life. The other half of Iraq's lands has been highly altered due to centuries of human activity and a recent assault on Iraq's landscape. The result is little or no natural ecosystems remain within the geopolitical boundary referred to as Iraq, a country once rich with human and natural heritage, a country that might now be referred to as ecologically bankrupt.

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6
Historical Geography

LTC James B Dalton, PhD

Key Points:

- Iraq's history dates back to the beginnings of civilization in Mesopotamia
- Periods of prosperity have been broken up by eras of conquest and destruction
- Saddam Hussein came to power in the 1970s with the support of Sunni Muslims, who had been relatively favored since times of British control

This chapter will highlight some of the key moments in the history of the area that is today Iraq. The primary focus will be on the societies and a few of the leaders/rulers that made significant impacts. The chapter will be broken down into the Ancient Mesopotamia, Arab Early Period, Ottoman Era, the British Period, Independent Iraq, and the Saddam Hussein Period. It is important to note that even though the flow from one historical period to another may be presented as if there were abrupt and immediate changes, this is for the most part not the case. Except during times of invasion, the transition between eras was often quite gradual.

Ancient Mesopotamia

The area that is today Iraq and Iran has been inhabited for at least 5,000 years. The region is rich with archeological sites that in the modern era have led to an ever increasing understanding of the people who live there. The first inhabitants were "vigorous, progressive, and aggressive" in all aspects of their lives (Polk, 1991). The remains they left behind tell of a people who

cultivated irrigated plants and built walls around their villages for protection. Irrigation and the widespread domestication of plants and animals created an agricultural abundance, and these surpluses allowed people to pursue other activities in areas such as politics, religion, and the arts. Excess agriculture also spawned trade, which required merchants, transportation providers, security forces, and public officials such as tax collectors. To keep the agricultural sector strong, communities needed good political organization to maintain common resources such as irrigation ditches. In time, Mesopotamian civilizations developed a system of writing (cuneiform), literature such as the later Gilgamesh saga, and governmental and legal codes, most notably the later Babylonian Code of Hammurabi (about 1750 BC).

The 3rd century BC was dominated by the Sumerians, with power focused on important cities such as Ur and Kish. Sumerian power waxed and waned, and eventually an equally powerful group known as the Akkadians shared control of the southern Tigris and Euphrates region during the late 3rd century BC. In about 1900 BC a Semitic people from the West, the Amorites, invaded and conquered the region, but "the invaders nevertheless carried on the Sumero-Akkadian cultural legacy" (Metz 1988).

The Amorites established new cities along the Tigris and Euphrates rivers. Most notable was Babylon, their capital. From here they ruled a large area through the use of an extensive system of complex laws built on the principle of "the strong should not oppress the weak". Many of the laws dealt with the economy and commerce, a reflection of the extensive trading network which spread out across the Middle East (Metz 1988). This Old Babylonian empire remained in control until invasions by groups such as the Hurrians and Kassites weakened it in the middle of the 2nd century BC. Shortly thereafter the Assyrians, another Semitic speaking group, became more important in the northern parts of the region. For centuries the Assyrians and Babylonians coexisted, sometimes fighting with each other and sometimes working as allies against other invaders. The Assyrian empire reached its greatest extent in the 7th century BC, but quickly declined in the following decades.

About 620 BC the Chaldeans, a group from near the Persian Gulf, took control of Babylonia. Under the rule of Nebuchadrezzer II, the Neo-Babylonian Empire flourished. It is during this time that the famed Hanging Gardens were said to be created.

By the 6th century BC the region fell to Persian control under the leadership of Cyrus II. Although Babylonia prospered,

Persian rule was resented by the various non-Persian groups in the Mesopotamian lowlands. When Alexander the Great arrived with his army in the late 4th century BC, he was viewed as a liberator, but his plans for the area were never realized due to his early death at age 32. After his death, Greek generals battled among themselves for the territory and accomplished very little in the way of improvements (Metz 1988). The frequent turnover in leadership would continue until 636 AD, when, with Mesopotamia in ruins, a Muslim army from the south captured the entire area. The Arab period had begun!

Arab Early Period

This period brought the Islamic faith to Iraq. Despite myths to the contrary, Arabs did not convert individuals at the point of the sword. Of those that did convert, many kept some of the traditions from their previous religion (Polk, 1991). In addition, the presence of both Sunni and Shiite Muslims in the region would create a cultural pattern that persists to the present.

Most notable during this period was the Abbasid Caliphate that ruled from Baghdad from 750 – 1258 AD. Their rule coincided with a period of great intellectual and agricultural development and a flourishing of the young Islamic faith. During this "Golden Age" the world was given classic stories such as "Ali Baba and the Forty Thieves", Sinbad stories, and other tales from *Arabian Nights*. The society they ruled had a mix of Sunni and Shiites from Iraq and Iran. For an extended time there was a balance between these groups, but eventually the death of a caliph caused a succession fight between two sons. The civil war that ensued weakened Abbasid rule and precipitated a slow, two hundred year decline in Baghdad's rule (Metz, 1988; Polk, 1991).

Thirteenth century Mongol invasions brought an end to the period of sophisticated urban life enjoyed by the people of this region. The grandson of Genghis Khan, Hulagu Khan, completed what his grandfather had started in 1227 by extending the territory under Mongol rule through Iran and into Iraq. He, and later Tamerlane, were ruthless, burning, pillaging, and killing to achieve victory. They are responsible for the destruction of many Abbasid advances, including extensive canal and irrigation systems along the Tigris and Euphrates Rivers (Metz, 1988).

Ottoman Era (1534 to 1918)

Between 1258 and 1534, chaos and survival best summarized the conditions in Iraq. A change began with the conquest

by the Ottoman Turks first of Kurdistan and then of Iraq and Iran. The Turks made little effort to change those they conquered, nor would they change the governments in control. More commonly, they would merely place a governor in charge of an area and let the locals run the day to day operations. This situation worked well for the Sunni population of Iraq that over time gained administrative experience that contributed to their ability to control the country in the 20th century. The Shiite population was outside the main political discourse during this period in Iraq. During the almost 400 years under Ottoman "control" tribal interests were the most likely political forces driving numerous smaller conflicts, religious differences were often sited as the rationale for the conflicts. This period ended with the fall of the Ottoman Empire in the early 20th century and without a noticeable impact on Iraq except higher education levels among the Sunni population as compared to Shiites and the introduction of Western ideas and technology (Metz, 1988; Polk, 1991).

The British Period and the Independent Iraq

To enlist the support of the local population during WWI, the British reached agreements that would grant independence to Iraq. Much has been written about the impact of this period and the influence of Britain (and the West) on Iraq (Polk, 1991; Metz, 1988). In short, British agreements had led the way for an independent Iraq. After WWI and the expulsion of the remnants of the Ottoman government, the British helped establish a government in Baghdad and facilitated the further movement of power from rural tribal leaders to urban areas. Through land reform measures and an economic pull to the urban areas, the population of the cities grew. By 1932 and independence, the real power balance in Iraq lay in the urban areas and not with the tribal factions. Urban populations were predominately Sunni and controlled most government offices.

Independence did not come peacefully but with conflict among the numerous constituents that make up modern Iraq. Metz (1988) noted,

> The declaration of statehood and the imposition of fixed boundaries triggered an intense competition for power in the new entity. Sunnis and Shias, cities and tribes, shaykhs and tribesmen, Assyrians and Kurds, pan-Arabists and Iraqi nationalists--all fought vigorously for places in the emerging state structure.

This statement highlights the complex nature of Iraqi culture and the competing factions causing tension and centrifugal forces within the new state. One often forgotten aspect is the conflict resulting from often arbitrary delineations of borders by the Europeans. Different ethnic groups were not given autonomy and subsequently located within Iraq against their desires. The Kurds of Northern Iraq were and are the most notable. Kurdish dislike for Iraq's government would become a wedge that Iran would use decades later to play the Kurds against the Iraqis during their long war in the 1980s.

The turmoil in Iraq was exacerbated during WWII when British troops once again returned to Iraq and with the support of the Iraqi monarchy occupied large areas of the country. Iraqi nationalists would not forget this and used this as an additional reason to oppose the monarchy. Finally, on July 14, 1958 the first of many coups overthrew the monarchy and established a republic. Never really obtaining stability, control of Iraq's government changed hands repeatedly from 1958 until Saddam Hussein arrived on the national scene in the mid-1970s. Hussein, aided by his political party and family ties, worked his way to the top and quickly concentrated power within his family.

The Hussein Era

The Hussein era, marked by relative internal stability and a sense of national unity, came about through a consolidation of power achieved by reducing internal opposition and by signing a treaty with Iran that ended, for a time, the use of the Kurds to incite dissent within their respective countries. Oil revenue was instrumental in the prosperity enjoyed by Iraq during the years prior to the Iran-Iraq war. With the war, started by Iraq, came a desperate time for both countries.

The reasons for the war are reported in both their current and historical context by Polk (1991) in great detail. It bears noting that Saddam Hussein has often been driven by both fear and opportunity. He noted the Shiite-led religious fundamental movement that toppled the Shah in Iran and feared similar problems among Iraq's majority Shiite population. This was the first of two strategic miscalculations by Hussein because it led him to fight a protracted land war with Iran in which neither side achieved anything resembling a victory. The second and even more costly was his decision to attack and occupy Kuwait in 1990. That strategic failure resulted in massive losses at the hands of a coalition force led by the United States. The ramifications of that conflict are still with us today and Saddam Hussein

continues to be a threat to his people and the world at large.

Conclusion

Iraqi history is a complex series of invasions and power changes. Groups entering Iraq from the north, east, south, and west have all controlled the region at one time or another over the past 5,000 years. In addition, Mesopotamian history shows that groups within the region often rose to challenge the central government or ruling power. Perhaps these historical realities partly explain Saddam Hussein's history of mistrust towards 1) his neighbors, a mistrust that led him to war in each of the past two decades; and, 2) minority groups within his own country, such as the Shiite and Kurdish populations. The lessons of history must not be forgotten when considering Iraq. They flow through the land like the waters of its great rivers.

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7
Cultural Geography

Jon C Malinowski, PhD

Key Points:

- Islam dominates, but is divided among Shiite and Sunni groups
- Iraq is the home of many important Shiite holy sites, including Karbala and Najaf
- Arabic is spoken by 80% of the population
- Kurdish languages are spoken by nearly 20% of Iraqis
- The uniqueness of Kurdish culture goes beyond language differences

Statistical tables reveal that the majority of Iraq's population practices the same religion and speaks the same language. But beneath the numbers lies a cultural pattern that is more diverse and complicated. An understanding of language and religion in Iraq provides a necessary foundation for insight into Iraqi politics, geopolitics, and history.

Religion

Islam

Nearly 97% of the Iraqi population call Islam their religion, but within the Muslim population an important division exists. Islam is divided into two major sects, Sunni and Shiite. This division dates back to the years just after the death of the prophet Muhammad in June of 632 AD. The religious community that Muhammad had established in present-day Saudi Arabia needed to appoint a successor for their leader in the absence of a male heir. In a space of just 25 years three men succeeded Muhammad as the head of the young religion. The third, Uthman, faced opposition from supporters of Muhammad's son-in-law Ali.

When Uthman fell to a murderer in 656, Ali became the head, or *caliph*, of the religion. After Ali's murder a half decade later, disagreement arose over whether Ali's successor should be a member of his family or someone chosen from the wider religious community. Those known as Shiites today are those who insisted that the successor should be one of Ali's family members. Later history would further divide the Shiites, and today numerous sects can be identified across the Muslim world. In total, Shiites are only 10-15% of all Muslims. Sunnis, who felt that a qualified Muslim could lead the early community, spread Islamic ideas through expansion and conquest, and now account for 85-90% of all Muslims.

Shiites survived as a minority in most areas, but played a critical role during several periods in the history of the region. They were involved in the founding of the Abassid Caliphate (750-945), centered on a grand new city known as Baghdad. Later the Abassid rulers would turn away from Shiite beliefs and violently put down Shiite uprisings. A Shiite state was established in Baghdad in 945 when the Buyids seized control of the city. Their rule lasted only until 1055, when they were overthrown by the Seljuk Turks. A small Shiite dynasty known as the Hamdanids also arose around the same time in Northern Iraq and parts of modern Syria. After the Seljuk Turks consolidated power, Shiite states disappeared until the Safavid Empire in Persia (modern Iran) adopted Shia Islam as the state religion in the 16th century. The Persian Safavids at times controlled much of modern Iraq. Thus we see that at various times Shiite influence in Iraq has been important.

The legacy of this history is that Shiites are the majority sect of Islam within Iraq, totaling about 53% of the Muslim population. Nearly all Shiite Iraqis are ethnically Arab with a small number of Turkmens, mostly in the north, being the exception. Sunnis account for 42% of the Muslim population and include not only Arabs, but also Kurds, Turks, and Turkmens. Because of Iraqi politics, Sunni Muslims are the more powerful group within the country. The ruling Baath Party is dominated by Sunnis and has repressed and even attacked Shiite populations. In addition, they have promoted a more secular state than other Muslim countries, thus reducing the importance of religion and religious traditions in society.

Geographically, Shiites have historically been located in the eastern and southern parts of the country while Sunnis have inhabited central and northern areas. Hussein's repression of Shiite "Marsh Arabs" and the draining of their riparian homelands in southern Iraq has reduced their numbers greatly as tens

of thousands fled to Iran for refuge. Hussein has long feared that Shiite populations pose a threat to his rule or would side with Iran during conflicts. For the most part, Shiite populations in Iraq actually supported their country during its long war with Iran during the 1980s.

In addition, Shiite Iraqis are more likely to be rural than Sunni communities. During the rule of the Ottoman Empire Sunni was emphasized in the schools and preferred in the government. Accordingly, Shiites stayed away from public education and government service. This rural-urban divide remains today.

Another important geographical aspect of Islam in Iraq is the existence of important holy sites. The most important is the Shrine to 'Abu 'Abdu'llah Husayn ibn 'Ali, the third *imam* (religious leader) of Shiite Islam, in Karbala. In 680AD Husayn, the son of Ali, traveled with a small army to Karbala to depose an unjust ruler. His forces were outmatched and Husayn, and his family, were brutally killed. For modern Shiites, this death is seen as a sacrificial gesture symbolic of the fight against injustice. Karbala is second only to Mecca for Shiites. Many Shiites travel to Karbala for pilgrimage, and small tablets made from Karbala clay are sent around the world for use during prayer.

A second important holy site is at Najaf, which Shiites believe is the resting place of Ali himself. The city has numerous Shiite seminaries and gave refuge to the Ayatollah Khomeini from 1963 to 1978. Khomeini's expulsion from Najaf by Hussein, at the request of the Shah of Iran, was a source of bitterness among Iran's Shiite community during the Iran-Iraq War. Two other important religious sites include Samarra and Kadhimain, a suburb of Baghdad.

Christianity

Naturally, other religious populations in Iraq are much smaller in number. Christians number about 3-4%, but are divided among different sects, such as Assyrians, Chaldean Catholics, Jacobites, and Syrian Catholics. The plight of Christians in Iraq has been difficult in recent years, and many now live either in refugee camps in Jordan or have joined family in Europe or North America.

Followers of the Assyrian Church are modern descendents of the Nestorian Christians of old. Nestorian Christianity was considered by mainstream Christianity to be a heresy because of different views on the nature of Christ's humanity and divinity. Their services often use a form of ancient Aramaic, generally recognized to be the language of Christ. Assyrian churches

can also be found in Iran and Syria, as well as in North America. There is also some connection to Malabar Christians in India. Chaldeans are also former Nestorian Christians who have been aligned with the Roman Catholic Church since the 16th century.

Jacobites and Syrian Catholics also trace their origins to so-called "heretical" movements. These ancient Christian groups also had different conceptions of Christ's divine nature. Syrian Catholics are Jacobites who are now in communion with the Catholic Church in Rome.

Yazidis

Numbering less than 1,000 worldwide, the Yazidis are a religious group based on a combination of Zoroastrian, Manichean, Christian, Jewish, and Islamic ideas. They are thought to be descended from followers of a 7th century Islamic ruler, the caliph Yazid. Their society is well-organized and somewhat secretive. Worship revolves around the angel Malak Ta'us, or "Peacock Angel", one of seven angels subordinate to a single but absent supreme God. Yazidis can be found near Mosul in Iraq as well as in Iran, Armenia, Turkey, and Syria. Nearly all Yazidis are ethnic Kurds.

Mandaeans and Other Groups

An old religion with uncertain origins, Mandaeans number less than 100,000 in southern Iraq, Iran, Europe, and North America. The religion is Gnostic in its beliefs, holding that esoteric knowledge is critical for salvation. Mandaeans emphasize the importance of communal baptism. Although not Jewish or Christian, Mandaeans revere John the Baptist. The community is centered in Baghdad and Al 'Amarah. Other religions in Iraq include small Jewish and Bah'ai communities.

Language

According to the Ethnologue database, Iraqis speak 23 native languages (Ethnologue, 2000). But this diverse collection is dominated by various dialects of Arabic, which together is spoken by about 80% of the population. In the central part of the country, including the area around Baghdad, Iraqis generally speak Mesopotamian Spoken Arabic. In the western parts of the country forms of Najdi Spoken Arabic dominate among Bedouin communities. In the southeast, Gulf Arabic is spoken by a small

number of Iraqis.

The second most commonly spoken language is Kurdi, spoken by a Kurdish population that makes up nearly 20% of the population. Kurdi speakers probably number around three million. Kurdish areas are mostly in the northern and eastern sections of the country. Another Kurdish language is Kurmanji, or Northern Kurdish, spoken by a relatively small number of Iraqi Kurds. It should not be assumed that all Kurds speak the same language, or that communication among dialects is easy. Kurdish populations are found Iran, Iraq, Syria, Turkey, and Azerbaijan and from one end of this area to the other significant linguistic differences can be found. The differences among Kurdish speakers have been described as being as distinctive as those between English and German (Ciment, 1996).

Unlike Arabic, which is classified as a Semitic language, Kurdish languages are Indo-European in origin, which connects the ancient history of the Kurds most closely to Iran, where the

Figure 7.1 Map of Major and Minor Languages in Iraq
Source: Based on information from Ethnologue (2002).

Indo-European language Farsi is spoken, than to Iraq or Turkey. Other Indo-European languages spoken in Iraq include Farsi, Luri, Hawrami, and Behdini, the first two also being spoken in Iran.

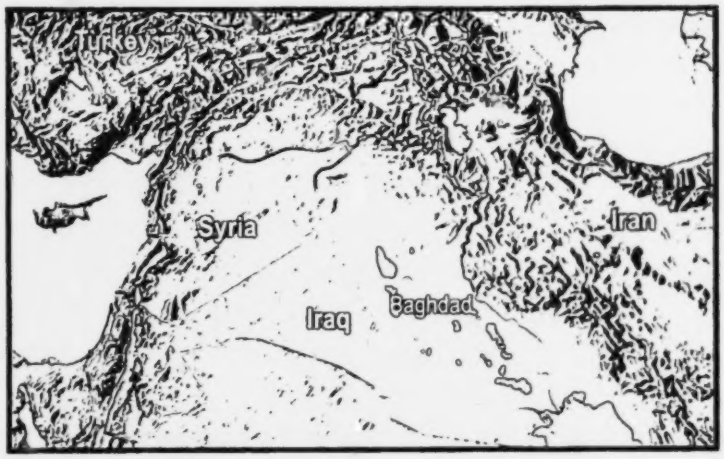
Other notable languages include Assyrian Neo-Aramaic, Chaldean Neo-Aramaic, South Azerbaijani, and Armenian. The diversity of languages in the mountainous terrain of the north highlights how terrain can provide protection for small ethnic communities that might get overrun in the accessible river valleys.

The Kurds

Although Kurdish religion and language have already been addressed, Kurdish culture deserves additional discussion. To review, Kurds are predominantly Sunni Muslims, but some Shiites can be found as well. Kurdish languages are distinctive but show great variation throughout Kurdistan (See Figure 7.2). There is no single Kurdish language.

In addition to linguistic differentiation, Kurds also have different dress, music, myths, and social customs than Arab Iraqis or their neighbors in Syria, Turkey, or Iran. Ciment (1996) argues that Kurdish culture must be understood in the context of a historical conflict between the mountain-dwelling Kurds and groups from the lowlands. He points to a tradition of highway robbery, thuggery, and violence as evidence of a need to survive

Figure 7.2 Dominant Kurdish Areas (in yellow)
Source: Based on CIA information



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tough conditions in a difficult environment. A warrior ethic is also attributed to the Kurds.

Kurdish society in Iraq remains tribal in many, but not all, areas. Households and marriage ties are important to establish lineages which combine with geographic location and political affiliation to form clans, which may order themselves to form tribes. Tribes are led by chiefs, known as *aghas*, drawn from important families. Chiefs gain much of their authority from *sheikhs* ("sheiks"), important leaders who have a part-religious, part-political foundation.

Conclusion

Iraq's cultural geography is much more fragmented than many Americans realize. Divisions among Muslim sects, linguistic and religious complexity, and ethnic diversity are all realities of Iraq's historic human landscape. There is no typical Iraqi citizen any more than there is a typical American, and any dealings with Iraq must keep this reality in mind.

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8
Political Geography

MAJ Andrew D Lohman

Key Points:

- Saddam Hussein remains solidly in power after 25 years of rule through shrewd politics and the ruthless destruction of any opposition
- The two strongest sources of opposition are the Kurdish populations in the North and Shiite Muslims in the South
- Although a minority, Sunni Muslims dominate politics
- Kurdish politics has often been characterized by internal disagreements and fighting

The modern state of Iraq occupies the heart of historical Mesopotamia, the "land amidst the rivers," between the Tigris and Euphrates rivers (de Blij & Muller, 2001). Although there have been countless monarchs, dynasties, and political powers that have ruled over this region throughout its history, its distinction as one of the world's oldest civilizations, and arguably one of the most influential culture hearths in human history, continues to influence the politics of the country and its role in the region. Despite this long and distinctive history, Iraq is more notorious since the end of the Gulf War because of its continued stance to defy not only its regional neighbors but also the global community. This chapter will discuss Iraq's political situation, including its relations on the international scene and its internal political dynamics.

The State

Territorially, Iraq encompasses an area of approximately 168,700 square miles (437,072 square kilometers), slightly larger in size than California (US Department of State, 2002). It has a

narrow outlet to the Persian Gulf (only 35 miles of coast line), which is still a sensitive issue with its neighbors Iran and Kuwait. Iraq has over 2,255 miles (3,631 kilometers) of land boundaries and shares borders with Iran (905 miles; 1,458 km), Saudi Arabia (505 miles; 814 km), Syria (376 miles; 605 km), Turkey (205 miles; 331 km) Kuwait (150 miles; 242 km), and Jordan (112 miles; 181 km) (CIA World Factbook). Along these borders, Iraq has several boundary disputes with its neighbors, primarily, with Iran over the *Shatt al Arab* (one of the attributed causes of the Iran-Iraq War), and Kuwait (which in addition to the islands of Warbah and Bubiyan, reportedly still harbors claims of Kuwait as its 19th province) (Anderson, 2000).

Despite cultural, ethnic and religious ties with the peoples of the neighboring states, Iraq's relations with these countries has been described as tenuous and strained (Held, 2000). Iraq has long "considered itself the eastern anchor of the Arab world and the natural eastern flank of the Arab Middle East," and as such, has to tried to assume its perceived position as a leader in the Arab and Islamic world (Held, 2000). However, Iraq has often been described as a "pariah" state and its invasion of Kuwait as well as its actions towards its neighbors both during and after the Gulf War have kept tensions in the region at a relatively high level since 1990 (Held, 2000).

Although the ruling regimes in both Syria and Iraq are factions of the Baath Party, a split between the ideologies of these factions have caused a rift between these two states and relations have been tense since the early 1960s (Sela, 1998; Held, 2000). Relations with Iran are, of course, still strained after the eight year war between the two in the 1980s and Iraq's relations with Saudi Arabia and Kuwait still reflect animosities from the Gulf War era. Occasionally, tensions flare with Turkey or Syria over water issues because the headwaters of the Tigris and Euphrates Rivers lie in Turkey and flow through Syria before reaching Iraq. Tensions are often further heightened between these three countries, and with Iran as well, because of Kurdish demands for increased autonomy and outright independence. Although Iraq's shortest boundary is with Jordan, this country has proved to be Iraq's most cordial neighbor and supporter. The Hashemite Kingdom of Jordan has gone to great lengths to maintain open relations with Iraq in the past twenty years and has served as a transit area for moving goods and supplies into and out of Iraq (Held, 2000).

In addition to Jordan's friendly relations with Iraq, the Palestinians, Sudan, and Yemen have been rather ardent and vocal supporters of Iraq (Anderson, 2000). And despite the tre-

Figure 8.1 Map of Iraq Showing Political Provinces
Source: *CIA World Factbook*, 2001

mendous condemnation of Iraq on the international scene, both Russia and France have argued for easing the UN imposed sanctions against the country (Anderson, 2000). However, Iraq essentially remains isolated from most of the world, although the UN Oil-for-Food program has allowed some interaction with regional and global trading partners.

Political Evolution

Iraq emerged from the remains of the Ottoman Empire after the First World War. In dividing up the territory of this Em-

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pire in 1918, Britain and France had a hand in parceling the territories and created a system of mandates whereby these European states garnered control over portions of the Middle East (Fromkin, 1989). Iraq, as the country today, was created from three provinces of the former Ottoman Empire: Mosul in the north, Baghdad in the center, and Basrah in the south (Ciment, 1996). Each of these provinces was, and for the most part still is, dominated by distinct cultural groups, drawn along ethnic, linguistic and religious lines, with a Kurdish majority in the north, a Sunni Muslim dominated central region, and the Shiia Muslim southern region.

This political arrangement was created in 1920 under British mandate and Baghdad, as the central region, emerged as the capital for several reasons. Because of its central location, advantageous position in the river basin, historical dominance in both political and economic arenas, as well as Britain's relationship with the Sunni factions in the region, Baghdad emerged as the center of political power in the country with the Sunnis in control (Ciment, 1996). This new "state" was initially created as the Kingdom of Iraq and Emir Feisal ibn Hussein (of the Hashemites) was installed as the King for his family's cooperation with the British against the Ottoman Turks during World War I (Fromkin, 1989). Intensely proud of its rich history and contributions to the civilized world, the new "country" did not relish its political domination under British mandate and clamored for independence, which it received in 1932; the first Arab mandate in the region to gain its freedom (Ciment, 1996). However, independence did not free it from British involvement in Iraq's internal affairs, driven of course, by Iraq's rich oil reserves and the control of that industry by the British dominated Iraqi Petroleum Corporation (IPC).

King Feisal died in 1933. Although his heirs nominally ruled until 1958 when his son was finally overthrown in a bloody coup led by General Abd al-Karim Qasim, there were actually over 20 different governments in power between 1948 and 1958, all of which have been described as weak, pro-Western, and unpopular (Ciment, 1996). At first, General Qasim and his leftist Free Officer's Association were extremely popular for a number of reasons, not the least of which was the expulsion of British and Western influence from the country and the nationalization of the oil industry. However, popular support quickly eroded and members of the Baath Party deposed Qasim in 1963 (Ciment, 1996). Only in power for a few months, the Baath Party regime was toppled in late 1963 but regained power in another coup in 1968, and since that time the Baath party, under the firm control-

ling hand of Saddam Hussein since 1979, has ruled Iraq.

The Baath Party (Arab Renaissance Party) continues to rule Iraq today, and although there are other political parties in reality, the Baath Party is, as described by the US Department of State (2002), "the only recognized political party in regime controlled territory." The Baath Party (also described as the Arab Socialist Resurrection Party) is essentially a socialist party, which initially formed in Syria in the late 1940s with the goal to unify the Arab world into "a unified democratic socialist Arab nation." (Kurbani, 1995; Metz, 1990). The party's basic principles were pan-Arab in scope, with the idea to unify the Arab countries of the region into one Arab Nation, and along with that, end the colonialism which had plagued the region (Hiro, 1998). While some of the basic Baath ideals have changed somewhat under Saddam Hussein's leadership, many assessments contend he still has illusions of pursuing this pan-Arab dream (Kurbani, 1995).

Iraq is officially a Republic and political rule in Iraq is supposed to be vested in a nine member Revolutionary Command Council (RCC), along with a legislative branch of a 250 member National Assembly (CIA World Factbook, 2001). All real

Table 8.1 Provinces of Iraq
Source: *World Geographical Encyclopedia, Volume 3, Asia*, 1995.

Province	Area (mi²)	Population**	Capital
Al Anbar	53,461	820,960	Ar Ramadi
Al Basrah	7,361	872,176	Al Basrah
Al Muthanna	19,972	315,816	As Samawah
Al Qadisiyah	3,147	559,805	Ad Diwaniyah
An Najaf	11,126	590,078	An Najaf
Arbil*	5,586	770,439	Arbil
As Sulaymaniyah*	6,571	951,723	As Sulaymaniyah
At Ta'mim	3,969	601,219	Karkuk
Babil	2,497	1,109,574	Al Hillah
Baghdad	283	3,841,268	Baghdad
Dahuk*	2,522	293,304	Dihok
Dhi Qar	4,979	921,066	An Nasiriyah
Diyala	7,363	961,073	Ba'qubah
Karbala'	1,943	469,282	Al Hindiyah
Maysan	6,204	487,448	Al Amarah
Ninawa	14,407	1,479,430	Mosul
Salah ad Din	9,554	726,138	Samarra
Wasit	6,621	564,670	Al Kut

* Designated as Kurdish Autonomous Region
** From 1987 Census

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power in the state, however, is arguably controlled by Saddam Hussein, who currently holds the positions of President, RCC Chairman, Prime Minister, and Secretary General of the Baath Party (US Department of State, 2002). Through control of the Baath Party apparatus, which Saddam has filled with his closest friends and relatives, he is able to maintain his control over the state.

According to *Iraq: A Country Study* (Metz, 1990), the Baath party is essentially considered an elitist organization, which has only a small number of actual full party members (about 30,000) with support of about ten percent of the population. Political success in Iraq is, of course, dependent entirely on party membership and loyalty to Saddam. Internally, Iraq is divided in to eighteen provinces, (See Figure 8.1 and Table 8.1) under the administration of a governor (appointed by the President) with what the US Department of State (2002) terms "extensive administrative powers." These provinces are further subdivided into districts and sub-districts and many of these officials, including mayors of cities and many towns are also appointed by the President (Metz, 1990).

In addition to the politically appointed governors, mayors, and other local leaders, the Baath party organization also plays an extremely important vital role in administering the state internally, which Metz (1990) describes in the following manner in *Iraq: A Country Study*:

> The basic organizational unit of the Baath was the party cell or circle (*halaqah*). Composed of between three and seven members, cells functioned at the neighborhood or the village level, where members met to discuss and to carry out party directives. A minimum of two and a maximum of seven cells formed a party division (*firqah*). Divisions operated in urban quarters, larger villages, offices, factories, schools, and other organizations. Division units were spread throughout the bureaucracy and the military, where they functioned as the ears and eyes of the party. Two to five divisions formed a section (*shabah*). A section operated at the level of a large city quarter, a town, or a rural district. Above the section was the branch (*fira*), which was composed of at least two sections and which operated at the provincial level. There were twenty-one Baath Party branches in Iraq, one in each of the eighteen provinces and three in Baghdad. The union of all the branches formed the party's congress, which elected the Regional Command (Metz, 1990).

Saddam Hussein has been able to maintain a tight grip on the reins of power in Iraq by controlling the Baath Party, and political allegiances in the country lie along cultural, ethnic, and religious lines.

Through his experience gained in almost twenty-five years of rule, Saddam has learned well how to exploit this to his advantage. Alliances between the regime and various tribal groups have been the dominant trend in Iraqi politics (Sela, 1998). Saddam has been able to secure allegiances and loyalties from tribal leaders through both the promise of rewards and the threat, and use, of punishments. The judicial system in Iraq, as described by the US State Department, includes three types of courts: civil (based on the French model), religious (based on *sharia* or Islamic law), and special courts (where "special courts try broadly defined national security cases"). With regard to rewards, in many cases Saddam has given "lands, funds, judicial autonomy over tribal matters, and exemptions from military services" to buy loyalties from various tribal leaders (Sela, 1998). His power is further enhanced through manipulating family bonds and in many cases, "key positions in the regime and control of major sectors of the economy are linked to intermarriages with Saddam Hussein and ties formed in his village of origin, al-Tikrit" (Eickelman and Piscatori, 1996).

Although the Sunni dominated central region of the country has, for the most part, been considered essentially loyal to the regime, Saddam's intrigues within Iraqi politics are believed to be changing the internal political dynamics. He has continued to consolidate and centralize his power and further the rampant nepotism as he strengthens the positions of his sons and closest family members. As a result, tribes formerly loyal to Saddam's regime are beginning to resent their weakening position and influence within domestic politics (Sela, 1998). Dissatisfied with their real or perceived loss of power in domestic affairs, several tribes have rebelled against Saddam, most notably the Jubayr tribe in 1990 and Dulaym tribe in 1995 (Sela, 1998; Ciment, 1996). Two of Saddam's sons-in-law defected to Jordan in 1995 and are further indicators of discontent in the regime over the past ten years. As in all cases of disloyalty, however, those involved in these breaches of loyalty have been dealt with quickly and severely.

Despite reports that other political parties are outlawed, several other political parties do exist in the country and represent the various ethnic factions in Iraqi society, although they exercise little or no power at all in the affairs at any level. Of the various groups, tribes, and parties in Iraq, the Kurds in the north

and the Shiites in the south are the most significant.

The Kurds

The Kurds have received a great deal of attention in the political arena due to their plight as perhaps the most populous "stateless nation" in the world today. (A stateless nation is a culturally homogenous group of people who lack the territorial means to achieve statehood) (de Blij & Muller, 2001). Aspiring to a state (country) of their own, the Kurdish people, in fact, extend across and inhabit portions of Syria, Iran, and Turkey as well as Iraq. In their quest for political sovereignty and statehood, the Kurds have, by all accounts, been "at war" with the governments of these countries, and in Iraq the Kurds have effectively been fighting against the Iraqi regime almost continuously for the past thirty years (Sela, 1998). Although the Baath Party is the only authorized political party in Iraq, the Kurds represent the next most politically powerfully group in Iraq.

In the last two major external conflicts (against Iran between 1980 and 1988 and against the Coalition forces during the Gulf War), the Kurds tried to take advantage of the opportunity to rebel in the hopes of attaining the territory to create an independent Kurdistan state. In both of these attempted rebellions, Iran and the United States reportedly aided the Kurds, but withdrew support when the conflicts with Iraq ended (Ciment, 1996; Sela 1998). Following the cease-fire agreement with Iran in 1988, the Iraqi government subsequently launched a campaign to punish the Kurds for their rebellious acts and support for Iran during the war (Ciment, 1996). In the ensuing *Anfal* campaign (*Anfal* is the the Koranic word for "spoils of war") the Iraqi government attempted to cleanse Kurdistan and effect the "removal of hundreds of thousands of Kurds from their mountain fastness and destruction of strategic swaths of their homeland" (Ciment, 1996)

During this two-year operation (1988-1990), Saddam's forces conducted what can be described as a scorched earth campaign. Males of fighting age in many cases were systematically killed, women tortured through starvation and thirst, beaten, raped, and relocated as their homes were destroyed, wells plugged, and fields salted in attempts to make their traditional homelands unlivable (Ciment, 1996). One of the more startling and shocking accusations during this period, though, is reports of Iraqi use of chemical weapons and agents against the Kurds. In one such chemical attack, on the Kurdish city of Halabja in April 1988, there were reportedly between 5,000 and 6,000 Kurdish

fatalities (Ciment, 1996; Sela, 1998). While there are numerous reports of such atrocities, many of the Kurds were resettled in Arab cities throughout Iraq, and into government built housing areas (which have been essentially described as almost like internment camps - surrounded by barriers and armed guards) (Ciment, 1996).

Despite this treatment at the hands of the Iraqi government, the Kurds again tried to rebel when Iraq was faced with another external conflict during the Gulf War. There are a number of accounts (Ciment, 1996; Sela, 1998) which claim the United States urged the Kurds to rebel after Gulf War but failed provide support when Iraqi ground forces turned on them. As a result, thousands were killed and perhaps as many as one million others fled as refugees into Turkey and Iran (Ciment, 1996).

Undoubtedly, such harsh and repressive methods against the Kurds are intended "to break the back of Kurdish resistance and prevent future uprisings" (Ciment, 1996). Furthermore, their resettlement into controlled housing areas and into Arab dominated cities and regions are intended to disperse them throughout the "loyal" portions of the population and dilute their

Figure 8.2 Map of Iraq's Administrative Divisions
Source: CIA Atlas of the Middle East, 1993

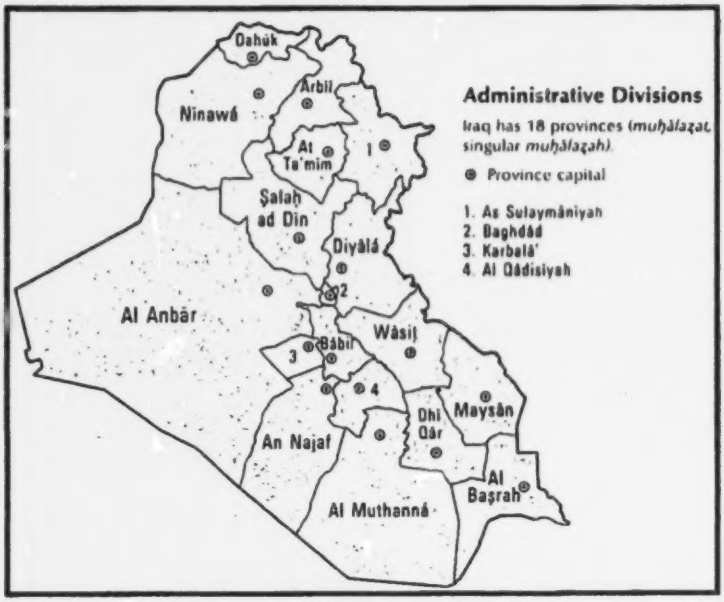

Figure 8.3 Map of the No Fly Zone
Source: Air Force News Service

political power and ability to unify and combine their efforts. Although the United Nations has not been able to stop Iraqi abuses against the Kurds entirely, the UN has taken several steps to provide the Kurds a measure of protection. The northern three provinces in Iraq (Arbil, As Sulaymaniyah, and Dahuk) (see Figure 8.2) were collectively organized into an Autonomous Region in 1992 (created under the UN Security Council resolution 688) (Sela, 1998). This region was effectively created to protect the Kurds from Iraqi reprisals following their rebellion and to create a safe area for Kurdish refugees to return from Turkey and Iran. Furthermore, the US sponsored "No-Fly" zone (Figure 8.3) north of the 36th parallel was created to prohibit Iraqi air power from harassing and bombing these Kurdish regions. However, the no-

fly zone prevents Iraqi air power from being used against the Kurds but Iraqi ground forces have made many incursions into this region and have regained control of some parts of Kurdistan. The areas currently under Kurdish control are often referred to as "safe havens" (Sela 1998)

Despite the creation of this Autonomous Region in Iraq (effectively called Iraqi Kurdistan) political and cultural infighting have kept the Kurds from becoming a serious threat to the Iraqi regime. While numerous smaller Kurdish political parties exist, the two dominant parties are the Kurdish Democratic Party (KDP) (located primarily in the northwestern part of Kurdistan along the Turkish and Syrian borders) and the Patriotic Union of Kurdistan (PUK) (located on the eastern portion of Kurdistan along Iranian border with the city of Sulimaniye as its effective "capital") (Ciment, 1996). Despite their mutual nationalist goal of attaining an independent and sovereign Kurdistan, these Kurdish political parties have been engaged in their own civil war on a relatively regular basis over the last thirty to forty years. Each of these political parties, including the smaller peripheral parties, have their own traditional militias, known as *Peshmerga* (literally "those who stare death in the face"), which serve as the military arm of their organizations to help achieve their political end states (Ciment, 1996; Sela, 1998).

Although there have been temporary coalitions of Kurdish political parties in the past, such as the Iraqi Kurd Front (IKF), such unions have invariably failed to produce any meaningful coalitions. Kurdish politics, like all political forces in Iraq, are driven by tribal ties and affiliations and are formed under traditional tribal leaders (*aghas*) (Eickelman & Piscatori, 1996). Past attempts to foster effective Kurdish unity, including ties with Kurdish parties and tribes in neighboring Iran, Syria, and Turkey, have been derailed as tribal feuds and competition for overall control have pitted Kurd against Kurd (Sela, 1998, Ciment, 1996). Political relationships are often complicated even further as Kurdish factions have been accused of conspiring with Saddam's regime, as well as the governments of neighboring states, against their fellow Kurds in desperate gambles to consolidate their power and gain exclusive control over Kurdistan.

The Shiias

Although the Kurds are the most noteworthy, as well as the best armed and organized of the groups opposing Saddam's rule, the Shiias (or also Shiites) in southern Iraq, represent a significant portion of the Iraqi population (Ciment, 1996). Esti-

mated to comprise anywhere between forty to sixty percent of the Iraqi population, the Shiias are a potentially powerful political force in the country. And like the Kurds, they have rebelled numerous times in the past. The last major uprising occurred in 1991 following the end of the Gulf War. The largest Shiia political organization in the country is the Supreme Council of Islamic Revolution in Iraq (SCIRI), which is believed to be supported and backed by the regime in Iran and is thought to have a large armed force, known as the Bader Force, at their disposal (Sela, 1998). However, despite their numbers and supposed support, the Shiia rebellion in 1991 was quickly and harshly quelled by Saddam's forces. Many of the Shiia were driven into neighboring Iran or sought shelter in the marsh region among the *Madan* (the "Marsh Arabs" who inhabit the marshy regions in the lower courses of the Tigris Euphrates valley regions) (Held, 2000).

In similar fashion to dealing with the Kurds, Saddam's methods for punishing the Shiias have been swift and ruthless. In an effort to drain the marshy central region between the two rivers, the Iraqi government began construction of the Main Outfall Drain (MOD) in 1992. Although ostensibly constructed to "reclaim" the land for development in this region, many theorize that this project has merely been an effort to destroy and eliminate this region as a sanctuary for the Shiia as punishment for this rebellion (Held, 2000). This has forced untold thousands to flee to other parts of the country and even to Iran, where they hoped to find relative peace from persecution. As further punishment, Held (2000) argues the Iraqi regime has been slow in repairing the infrastructure in the Basrah region devastated during the Gulf War, which is perceived as another form of punishment for rebelling and has also added to the tension between Sunni and Shiia in Iraq. In an effort to protect the Shiia from Saddam's reprisals, the UN created a southern "No-Fly" zone south along the 33rd parallel (Figure 8.3).

Conclusion

While there has been a profound interest in Iraq by the rest of world as a result of the Gulf War and Iraq's defiance of United Nations sanctions and resolutions, there has, in fact, been a relative shortage in current, timely up-to-date information on the country itself because of these tense political relations. UN Weapons inspectors were expelled in 1998 and relatively few outsiders have been in the country to truly give an accurate picture of political conditions in the country today.

Despite this apparent void of hard, confirmed evidence of

conditions and happenings in the country, a number of conclusions can be drawn. First and foremost is Saddam's relative stability in power, which can be effectively attributed to several domestic political factors (Sela, 1998). First and perhaps foremost, Saddam is able to command the loyalty of a number of key players and elements of society. This loyalty though, is the result of both close family and tribal ties, as well as the network of secret police (*mukhabarat*) who, it can be assumed, are virtually everywhere in the country. Secondly, the weakness of opposition in the country has effectively prevented political rivals from challenging Saddam's regime. As long as the Kurds fight among themselves, the Shiias are kept isolated and poor, and Sunni tribes vie for political favor from Baghdad, it is believed that Saddam will be able to retain control. But his stability is also ensured by the relative ambivalence of neighboring states (Sela, 1998). It is the "fear of political chaos" in the region and the potential fallout that might affect the neighboring states that have helped to maintain Saddam's position of power in Iraq. Clearly, Turkey, Iran, and Syria are leery of disturbing the balance of power in the region due to the lingering Kurdish question and the fear of losing sovereignty over territory to an independent, and expanding, Kurdistan.

Iraq's overall political situation, in regional, international, and domestic affairs is an extremely complicated and precarious one. Clearly, Saddam's regime is able to retain power through its repressive and tyrannical rule, but his political shrewdness cannot be denied. He has been able to retain control of the state for almost twenty-five years by using the cultural and ethnic diversity of the country to his advantage. He has centralized his power and continues to integrate his son Qaddai into the political fold. Furthermore, although Iraq is officially a "secular" republic, Saddam has not hesitated to evoke Islam as a rallying cry to marshal the support of the Islamic and Arab world against the West (in fact, the words *Allah Akbar* "God is Great" were added to Iraq's flag in January 1991 during the Gulf Crisis) (CIA World Factbook, 2001). Yet popular support from the Iraqi people for Saddam remains the critical question. As Colbert Held (2000) states: "Whether support of Iraqi people for national defiance of the sanctions is voluntary or forced upon them by leadership is a crucial question for the world in the new millennium." This, and other questions, about Iraq are difficult to answer because of the complex and potentially volatile nature of Iraq's internal political dynamics. And Saddam's firm hand will undoubtedly continue to keep outside influence from entering Iraq and gaining a true picture of the state of affairs in the country.

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9
Economic Geography

CPT Albert A Lahood

Key Points:

- Based solely on oil reserves, Iraq is one of the richest countries in the world
- Because of United Nations sanctions and governmental neglect, the Iraqi people are the poorest in the region
- Iraq has almost no capacity to grow its own food

> Iraq's economy has been dominated by the oil sector, which has traditionally provided about 95% of foreign exchange earnings [however] ... Iraq's economy has been severely damaged by war, mismanagement, corruption and by the sanctions imposed upon it as a result of Iraq's attack on Kuwait in 1990. (CounrtyWatch, 2001).

Conducting an economic assessment of Iraq's current conditions is difficult at best. The scant economic data that are available only serve to obscure the fact that since 1995 the Iraqi economy is solely based on the United Nations "food-for-oil" program under United Nations Security Council Resolution 986 (UNSCR 986), and to some unknown extent, illegal oil smuggling operations. Therefore, the health of the Iraqi economy is largely controled by the UN Security Council through the auspices of the 189 member states of the United Nations. If the Iraqi government ever decides to comply with the terms dictated in UNSCR 687, it possesses the resource potential to become one of

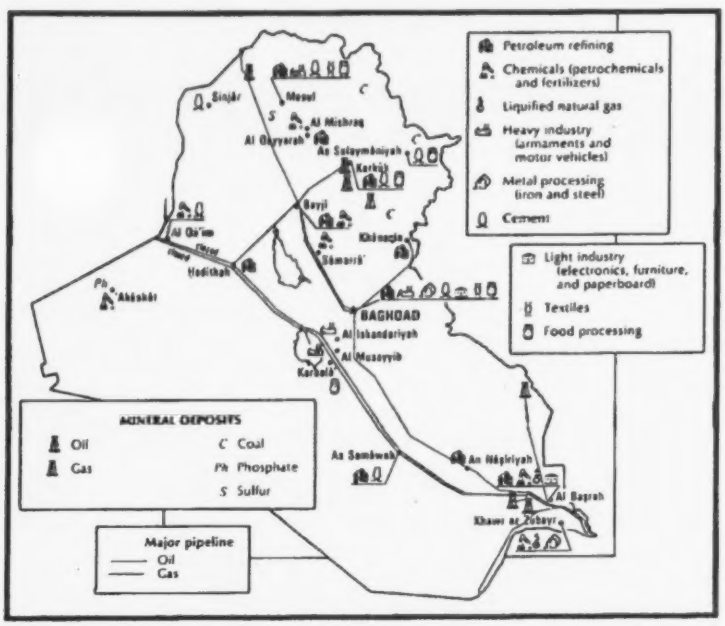
the region's leading economic powers and top global petroleum producer. However, the damage to the state's infrastructure resulting from 20 plus years of conflict and neglect must be repaired before Iraq can effectively capitalize on its bountiful resource base.

This chapter will first consider the current economic conditions of the Iraqi state and its economic potential by reviewing Iraq's primary resource base, and the industrial, agricultural, and transportation sectors. Secondly, the current economic conditions will be explored in terms of how they affect the Iraqi people and their every day lives.

Primary Resources

Iraq is one of the most resource rich Middle East and North Africa states (MENA). In terms of hydrocarbon fuels Iraq has a proven oil reserve of 112 billion barrels of oil and an estimated 215 billion barrels of probable oil in the currently exploited geomorphic formations (Energy Information Administra-

Figure 9.1 Economic Activity
Source: *CIA Atlas of the Middle East*, 1993



tion [EIA], 2001). The oil is primarily concentrated in two areas, Karkuk in the north and al Basrah in the southeast near the confluence of the Tigris and Euphrates Rivers (See Figure 9.1).

This establishes Iraq as having the second largest oil reserve in the world following Saudi Arabia (EIA, 2001). Furthermore, this estimate is understated because Iraq is believed to possess "deeper oil-bearing formations located mainly in the Western Desert region," though this area has yet to be explored (EIA, 2001). This unexplored region could place Iraq in the position of having the world's largest petroleum reserve. Additionally, Iraq has a vast amount of associated and non-associated natural gas. It has a proven store of 110 trillion cubic feet (Tcf) and 150 Tcf of probable reserves (EIA, 2001). About 70% of this natural gas is associated with the oil fields near Karkuk and al Basrah (EIA, 2001).

Not only is Iraq well endowed with hydrocarbon fuels, but it also has an abundance of the most important Middle Eastern resource of all...water. Iraq's borders contain the Tigris and Euphrates rivers, which combined have a flow of 75-85 billion cubic meters annually (Anderson, 2000). This large perennial surface flow makes it one of the top five among the MENA states, and coupled with Iraq's relatively small population, 23 million, one of the highest water volume per capita in the region (CIA, 2001). Iraq has a large amount of surface water crossing its borders, but does not control the headwaters of rivers such as the Tigris and Euphrates. Turkey now effectively controls the flow of both rivers through Iraq because of its Grand Anatolia Project, or GAP, which includes a series of large dams and reservoirs (BBC News, 2000).

Industry

Iraq's industrial sector is, and has been since the 1950s, concentrated in the extraction of crude oil and natural gas for export. This sector virtually replaced the agricultural sector that dominated Iraq's economy for thousands of years. The once private oil industry was nationalized after the Shah's fall in Iran so that the Oil Ministry now oversees the Iraq National Oil Company.

Iraq has a limited oil refinery industry capable of 400,000 barrels per day (bbl/d) of finished petroleum products (EIA, 2001). Out of Iraq's 10 refineries, Baiji North and the Basrah, Daura, and Nasiriyay plants in the south are operating around 100,000 bbl/d. Because of the small quantities, it is mainly refined for domestic consumption.

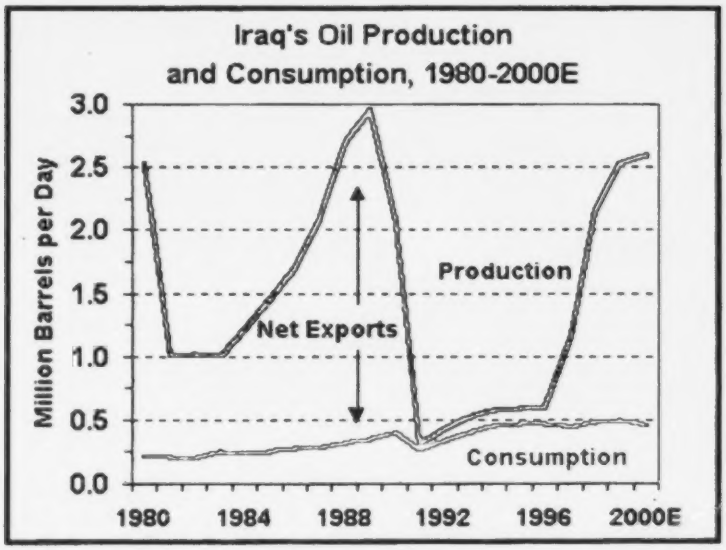


Figure 9.2 Oil Production & Consumption, 1980 to 2000
Note: Production includes crude oil, lease condensate, natural gas liquids, ethanol, and refinery gain.
Source: Energy Information Administration, 2001

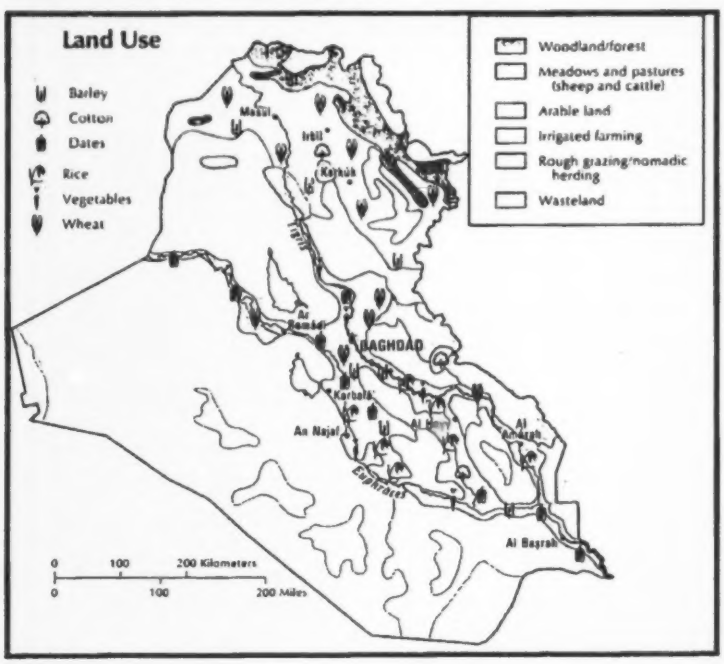
Prior to the Gulf War, the Rumaila oil field near Basrah was producing 1.4 million bbl/d and the Karkuk oil fields 900,000 bbl/d (EIA, 2001). This level of output fell to approximately 300,000 bbl/d in 1991 and remained there until UNSCR 986 initiated the oil-for-food program (See Figure 9.2). Currently Iraq is legally exporting 2.29 million bbl/d of oil through the UN, of which 60% of the earnings goes directly to food and medicine, 30% is directed to the Compensation Commission and 10% funds the UN mission in Iraq (CounrtyWatch.com 2001; EIA 2001). Essentially this is the Iraqi economy; today Iraq cannot legally export any commodity without permission from the UN, and as per UNSCR 687 all oil revenues are funneled through the UN under the terms of UNSCR 986.

The oil that is exported is shipped via the 600 mile Karkuk-Ceyhan pipeline that connects the Karkuk oilfields to Turkey and is capable of moving 1.1 million bbl/d. There is a second parallel line designed to carry 500,000 bbl/d of export oil from al Basrah to Turkey, but this line is currently inoperable (EIA, 2001). In 1975, Iraq finished construction on its 1.4 million bbl/d revisable strategic pipeline. These twin north-south lines

allow Karkuk to ship oil to Iraq's Persian Gulf ports and al Basrah to ship to Turkey, however, these lines are also inoperable (EIA, 2001). This is not the only source of revenue for the Iraqi government. As early as 1997 there have been allegations that Iraq has been illegally exporting oil through the 50 year old Banias pipeline connecting Karkuk to Syria and Lebanon (EIA, 2001). Syria has stated it would comply with the guidelines established in UNSCR 986 with regard to any oil it receives from Iraq (CounrtyWatch, 2001; EIA, 2001).

As of March 2000 Iraq was averaging 2 million bbl/d of legally exported crude oil, most of which is exported through the southern port of Mina al-Bakr versus the Karkuk-Ceyhan pipeline (EIA, 2001). This increases the difficulty for the UN to monitor food-for-oil sales and increases the potential for Iraqi oil smuggling operations via ocean routes. Primarily Russian, as well as, Italian, Malaysian, French and Chinese companies purchase most of the exported oil for resale to the larger markets in North America Europe and Japan, of which, the United States consumes over 25%, or 600,000 bbl/d (CounrtyWatch, 2001; EIA, 2001).

Figure 9.3 Land Use
Source: *CIA Atlas of the Middle East*, 1993



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Agriculture

Although approximately 12% of Iraq's landmass is arable, less than 1% of this area is dedicated to permanent cropping (CIA, 2001; CountryWatch, 2001). The once well-irrigated productive lands between the Tigris and Euphrates have either been abandoned or have become salinized (FAO, 1997). As Figure 9.3 and Table 9.1 show, Iraq once had a fair amount of crop diversity.

The salinization problem, coupled with the urban pull factors of wage labor and service sector employment, has resulted in Iraq becoming dependent upon food imports. As much as 65% of Iraq's food supply was imported prior to the Gulf War (FAO 1997). Since the Gulf War and the resulting economic sanctions, Iraq has been unable to purchase adequate food imports to support its population. The United Nations, in an attempt to mitigate the impending famine, adopted UNSCR 986. The oil-for-food policy is meeting the food requirements of Iraq, but it is only a temporary solution. The people are now dependent upon humanitarian food rations (2,030kcal and 47g of plant protein p/person p/day) purchased from the proceeds of controlled crude oil sales (FAO, 1997). The Iraqi people will remain at risk of famine until the government reclaims the lost agricultural capability and food imports are stabilized. If there is any interruption in the oil-for-food program, Iraq will be unable to feed its 23.3 million people.

Transportation

Iraq has a limited highway system and the majority of its roads emanate out of Baghdad as radial spokes with very few interconnecting beltways. This radial road network centralizes all intrastate interaction on Baghdad with the exception of al Basrah (see Figure 8.1).

Currently, Mina al-Bakr is the only operational port that can accommodate supertankers. Iraq's other tanker capable ports were rendered inoperable during the Gulf War (EIA, 2001). However, al Basrah's strategic location at the mouth of the Shatt al Arab section of the Tigris and Euphrates places this city in a position to become Iraq's primary break-in-bulk point. Additionally, the al Basrah and Umm Qasr dry port facilities are being upgraded to handle tanker ships. With the development of al Basrah as a tanker port, Iraq will have a port that is clearly within its borders and not within the contested border with Iran or within the UN Iraq-Kuwait Observation Mission (UNIKOM) buffer zone.

Crop	1995			1996			1997		
	Area ('000 ha)	Yield (kg/ha)	Production	Area ('000 ha)	Yield (kg/ha)	Production	Area ('000 ha)	Yield (kg/ha)	Production
Wheat	1 535	805	1 236	1 500	867	1 300	1 405	757	1 063
Barley	1 389	642	892	1 650	788	1 300	1 173	663	778
Paddy	175	1 800	315	120	2 250	270	121	2 016	244
Maize	75	1 200	90	60	2 083	125	61	1 984	121
Total	3 174	798	2 533	3 330	899	2 995	2 760	799	2 206
Changes compared to 1995 (%)	-	-	-	+5	+13	+18	-13	0	-13

Table 9.1 Iraq - Area, production and yield of cereal crops, 1995 to 1997
Source: Food and Agriculture Organization, 1997

Conclusion

Iraq has the natural resources to make it one of the richest countries in the region and propel it into the 21st century as a modern state. However, 20 years of conflict and the associated economic sanctions have wrecked its infrastructure and its ability to capitalize on its oil. Because of the actions of the Iraqi government, its people have been relegated to living in one of the poorest states in the region and being dependent upon humanitarian assistance for survival. There seems to be no positive economic prospects for Iraq until there is a change in its relationship with the United Nations and the international community.

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10
Population & Urban Geography

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MAJ Brandon K Herl

Key Points:

- Iraq's population is not uniformly distributed
- Population is clustered in the cities of Baghdad, Mosul, and Basra
- Iraq's population is growing fast, causing a large population under age 14
- Demographic statistics reveal the poor quality of health care in Iraq

Iraq's 22 million people are not distributed uniformly across the country. The physical geography of Iraq and the region's harsh climate influence the current distribution of human habitation. As Figure 10.1 indicates, the southwestern half of Iraq west of the Euphrates River is very sparsely populated. This region has between 0 and 65 persons per square mile. The majority of Iraq's population lives in the floodplains of the Tigris and Euphrates Rivers and are concentrated in and around the capital of Baghdad. The provinces of Babil and Karbala, located south of the capital, are also densely populated relative to the rest of the country. These areas contain between 194 and 453 person per square mile.

The majority of the Iraqi people live in cities, with 76% of the population considered urban and only 24% rural (Microsoft Encarta, 2001). One of every five to six Iraqis live in the capital of Baghdad. Baghdad, on the Tigris River, has a population of nearly 4 million, is the capital, and the largest city. Baghdad is also the center of air, road, and railroad transportation in the country. As the leading manufacturing city, it has numerous oil refineries, food-processing plants, tanneries, and tex-

tile mills. The greater Baghdad area is presented in Figure 10.2.

Mosul is Iraq's second largest city with a population estimated at 665,000 in the immediate city and 2,500,000 in the surrounding areas (World Gazetteer, 2002; CountryWatch, 2002). The Mosul of bygone eras was a major stopping point along the caravan routes between the Mediterranean Sea, Persia (modern-day Iran), and India. As a testament to its former livelihood as a trade city, older ruins reveal walls similar to those of other cities along the caravan routes to Asia (Arabnet, 2002).

Mosul is chiefly an agriculturally-grounded city with its primary revenues coming from cotton production and related textile production (CountryWatch, 2002). This region of Iraq is also home to the best non-irrigated arable lands in the country because of higher annual rainfall totals. The central government's indifferent, and occasionally hostile, relationship with the ethnic Kurds of this region make the area in and around Mosul a potential flashpoint for civil unrest (Encyclopedia Britannica Online, 2001; CIA, 2001; CountryWatch, 2002).

Although Mosul is not technically at the headwaters of the Tigris River, the lands around Mosul contribute a great deal to the river's flow. Because of the relative abundance of water, and thus agricultural production, Mosul and its hinterland may hold the key to Iraq's long-term survival. The greater Mosul area is depicted in Figure 10.3.

Basra

Basra (Figure 10.4) is Iraq's third largest city and the country's main seaport. Population estimates for the city range from 410,000 in the city to 1,300,000 persons in the local area (World Gazetteer, 2002; CountryWatch, 2002).

As the city common to both the Tigris and Euphrates Rivers as well as its location between the Great Marshes to the northwest and the Shatt al-Arab waterway to the Persian Gulf to the south have made it a city of immense strategic importance both militarily and commercially (CountryWatch, 2002). The city's strategic location was important in its founding in 637 AD as both a military base and a departure point for Far East trade. Many of the tales of Sinbad have this legendary sailor frequenting the port during his many journeys (Arabnet, 2002). Outside of legends, this city has been one of the most fought-over cities in the region with repeated wars and battles over the last 500 years.

Basra controls the entry and exit to the lands upriver of the Tigris and Euphrates. Because the great rivers are not navigable by large ocean-going vessels upstream from Basra, the city

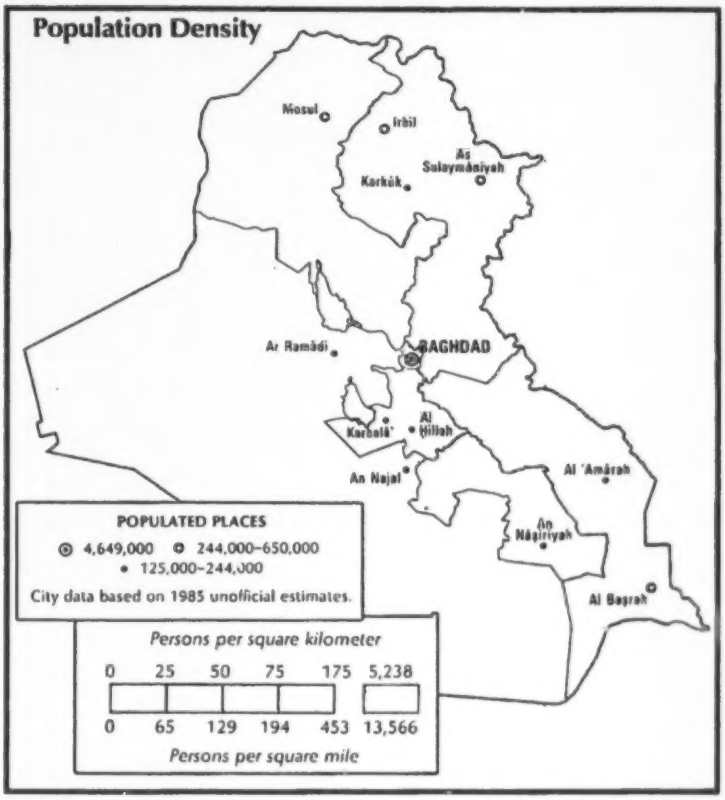

Figure 10.1 Population Density
Source: Central Intelligence Agency, 1993

serves as the country's major port. As such, control of Basra amounts to control of Iraq's access to the sea as well as access to major oil and natural gas fields. Iraq has and will continue to view the Basra region as a life-and-death point of contention in any conflict.

Rural Populations

Over five million Iraqis are considered rural. In the rural areas of the country, many of the people still live in isolated communities, leading a nomadic or semi-nomadic existence and

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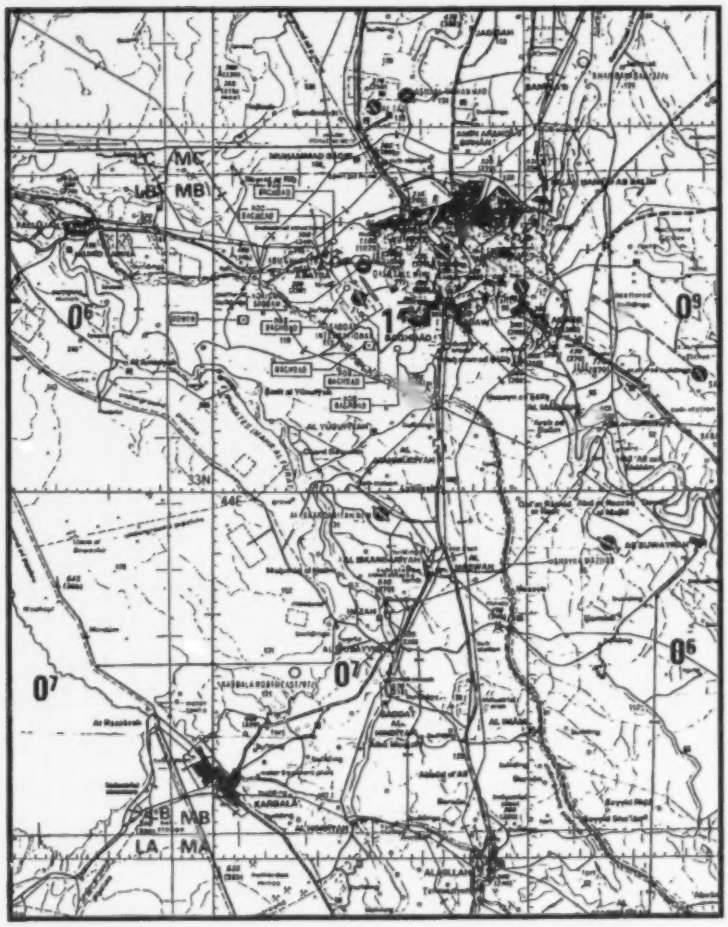

Figure 10.2 Baghdad and Vicinity (Scale: 1:500,000)
Source: Defense Mapping Agency, 1991

keeping heard of camels, horses, and sheep.

Population Density

One way to explore population is in terms of density, a numerical measure of the relationship between the number of people and some other unit of interest expressed as a ratio. For

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example, crude density (sometimes referred to as arithmetic density) is probably the most common measurement of population density. Crude density is the total number of people divided by the total land area.

According to the U.S. Census Bureau, Iraq had an estimated population of 22,676,000 in the year 2000. These people inhabit a state with a land area of 168,900 square miles. This land area is slightly larger than the state of California. Iraq's population density is equal to 134 persons per square mile. For the sake of comparison, California has a population density of 212 persons per square mile. These data do not reflect an important concern for Iraq and that is the amount of arable land in the country. According to the Central Intelligence Agency, only 12 percent of the land in Iraq is considered arable (CIA World Factbook, 2002). Therefore, when we calculate the physiologic density, which takes into account the arable land, Iraq has a population density of 1,204 persons per square mile of arable land. This is a much more useful measure for comparison. For the sake of comparison, Iraq's measure of 1,204 is roughly three times that the of the United States. This physiologic density suggests a condition in Iraq in which there is tremendous stress on the country's farmland to feed the country's growing population. Iraq's farmland is declining in productivity due to soil salinization, which is caused by insufficient drainage and by saturation irrigation practices. In addition to the 12 percent of the land that is arable, 8 percent of Iraq is irrigated farmland. However, government sponsored water control projects have destroyed wetland habitats in the eastern region of the country by diverting or drying up tributary streams that formerly irrigated wetland areas. Moreover, the challenge to feed the growing population will increase the amount of land that must be irrigated. This will increase Iraq's need for water – a scare commodity in this region of the world. This need for irrigation could possibly result in future water conflicts with neighboring countries, especially Turkey.

Population Structure

In addition to exploring patterns of distribution and density, population geographers also examine population in terms of its composition, that is, in terms of the subgroups that constitute it. Understanding population composition enables analysts to gather important information about population dynamics. For example, knowing the composition of a population in terms of the total number of males and females, proportions of old people and children, and number and percentage of people active in the

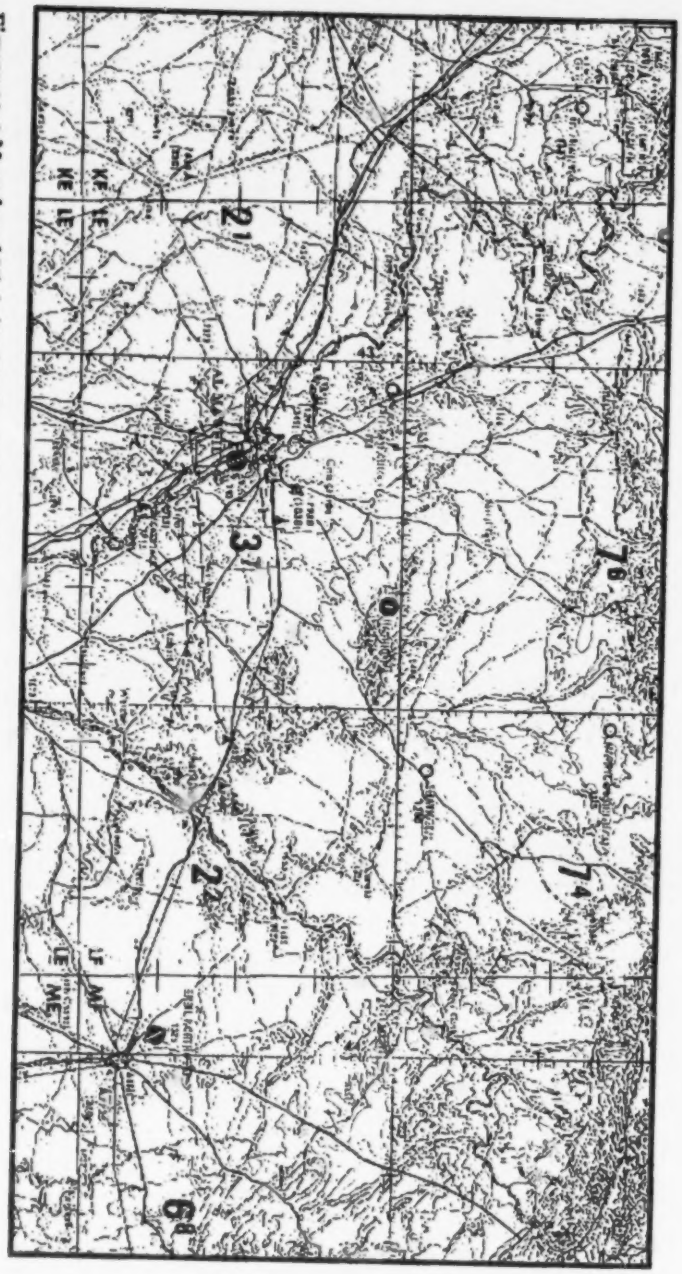

Figure 10.3 Mosul and Vicinity (Scale: 1:500,000)
Source: Defense Mapping Agency, 1989

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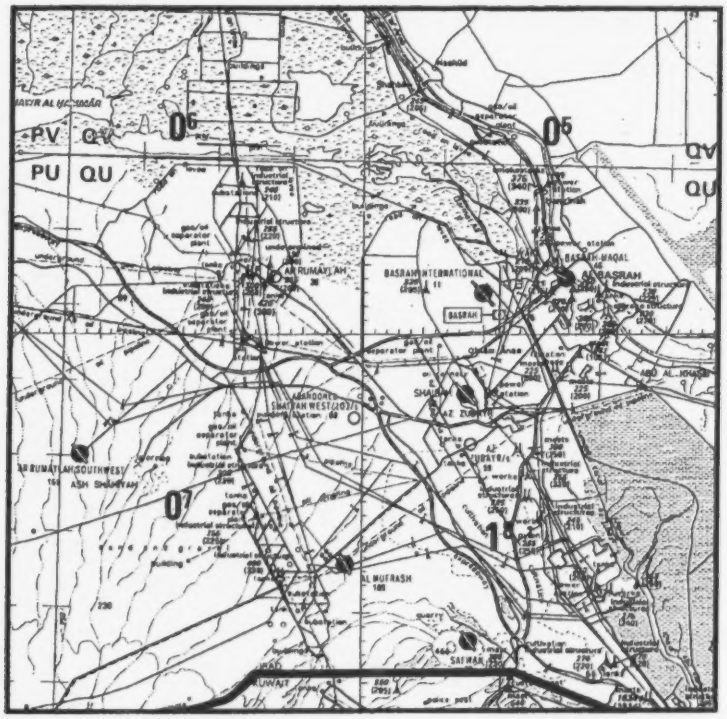

Figure 10.4 Basra and Vicinity (Scale: 1:500,000)
Source: Defense Mapping Agency, 1991

workforce provides valuable insights into the ways in which the population behaves.

The most common way for demographers to graphically represent the composition of the population is to construct an age-sex pyramid, which is a representation of the population based on its composition according to age and sex. Age categories are ordered sequentially from the youngest, at the bottom of the pyramid, to the oldest, at the top. By moving up or down the pyramid, one can compare the opposing horizontal bars to assess differences in frequencies for each age group. A cohort is a group of individuals who share a common temporal demographic experience. A cohort is not necessarily based on age, however, and may be defined according to criteria such as time of marriage or time of graduation.

Age-sex pyramids can reveal the important demographic

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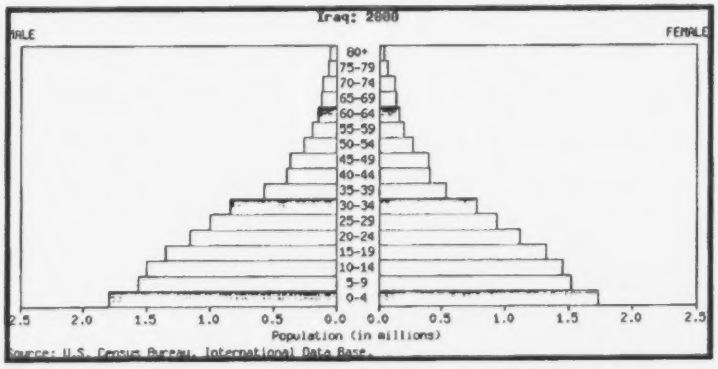
implications of war or other significant events. Moreover, age-sex pyramids can provide information necessary to assess the potential impacts that growing or declining populations might have. Now, let us take a look at the age-sex pyramid for Iraq (Figure 10.5) and the accompanying data (Table 10.1) for the year 2000.

Table 10.1 reveals two interesting points that must be considered in more detail. The first and perhaps most important point to make about Iraq's population composition is that 42 percent of the total population is below the age of 15. This is a very high percentage compared to the world average of 30 percent. However, Iraq's percentage is comparable to other fast growing Arab states in the region such as Jordan, Saudi Arabia, and Syria, which all have values exceeding 40 percent.

What are the implications of this type of age composition? The considerable narrowing of the pyramid toward the top indicates that the population of Iraq has been growing very rapidly in recent years. The shape of Iraq's profile is typical of countries with high birthrates and relatively low death rates. Two important economic consequences of this youthfulness are that age structure affects the level of dependency and it puts severe strains on the economy to generate savings for the investment needed for industry and for the jobs sought by an ever increasing number of new entrants into the labor force. In other words, children generally do not work and therefore must be supported. But when they become old enough for a job, employment must be available.

A high rate of population growth leads to a situation in

Figure 10.5 Population Pyramid, 2000
Source: United States Census Bureau International Database, 2002



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which the ratio of workers (people of working age) to dependents (people either too young or too old to work) is much lower than if a population is growing slowly. This means that in a rapidly growing society, each worker will have to produce more goods just to maintain the same level of living for each person as in a more slow-growing society. This may seem like an obvious point. The father of six children will have to be more productive (or earn more money) than the father of three just to keep his family living at the same level as the smaller family. But it goes deeper than that. A state depends at least partially on savings from within its population to generate investment capital with which to expand the economy, regardless of the kind of political system that exists. With a very young age structure, money gets siphoned into taking care of more people (buying more food and

Table 10.1: Population Composition for Iraq, 2000
Source: United States Census Bureau

Age	Total	% of total	Male	% of total	Female	% of total
Total	**22,676**	**100.00%**	**11,465**	**50.56%**	**11,210**	**49.44%**
00-04	3,531	15.57%	1,796	7.92%	1,736	7.66%
05-09	3,079	13.58%	1,563	6.89%	1,516	6.69%
10-14	2,959	13.05%	1,502	6.62%	1,457	6.43%
subtotal	*9,569*	*42.20%*	*4,861*	*21.44%*	*4,709*	*20.77%*
15-19	2,675	11.80%	1,355	5.98%	1,320	5.82%
20-24	2,279	10.05%	1,161	5.12%	1,118	4.93%
25-29	1,929	8.51%	995	4.39%	935	4.12%
30-34	1,617	7.13%	839	3.70%	779	3.44%
35-39	1,109	4.89%	571	2.52%	538	2.37%
40-44	801	3.53%	392	1.73%	409	1.80%
45-49	754	3.33%	363	1.60%	391	1.72%
50-54	529	2.33%	256	1.13%	273	1.20%
55-59	395	1.74%	193	0.85%	202	0.89%
60-64	307	1.35%	149	0.66%	158	0.70%
subtotal	*12,395*	*54.66%*	*6,274*	*27.67%*	*6,123*	*27.00%*
65-69	256	1.13%	119	0.52%	137	0.60%
70-74	227	1.00%	103	0.45%	125	0.55%
75-79	134	0.59%	62	0.27%	72	0.32%
80+	92	0.41%	48	0.21%	44	0.19%
subtotal	*709*	*3.13%*	*332*	*1.46%*	*378*	*1.67%*

providing education services for example) rather than saving per se.

A second concern for countries with fast growing populations is the number of prospective entrants into the labor force. If economic development is to occur, the number of new jobs must at least keep pace with the number of people looking for them. The expansion of jobs is, of course, related to economic growth, which in turn relies on investment and may be harder to generate with a young age structure. There are several economic and political reasons why Iraq's economy is not growing fast enough to keep up with its population growth. This chapter will not detail these reasons, but in short, two recent wars have severely reduced economic activity. In addition, economic sanctions imposed by the United Nations since the end of the Gulf War have proven to be an obstacle to growth. This economic growth is essential for Iraq's expanding population.

Birth and Death Rates

The crude birthrate (CBR) is the total number of live births in a year for every thousand people in the population. The crude birthrate for Iraq in the year 2000 was 35. This CBR was 30 percent above the regional average. Only Saudi Arabia has a higher birth rate. To give this number some perspective, consider that it is over twice the number of the United States, which is 14. Although the level of economic development is a very important factor shaping the CBR, other, often equally important influences also affect CBR. The case of Iraq is similar to other Arab-Muslim states in Southwest Asia. Saudi Arabia, Jordan, and Syria, all bordering Iraq, have similarly high birth rates. These data suggest that high birth rates are not simply an Iraqi phenomena. Rather, high birth rates in the Arab-Muslim world reflect religious, social and other cultural factors. Low levels of female education have been repeatedly linked to higher birth rates. For example, in Iraq only 45 percent of women in the country are literate. This compares with a male literacy rate of 70 percent (CIA World Factbook, 2002). Diet and health, war and other political unrest are also mentioned by scholars as reasons why birth rates are higher than average in the Arab-Muslim world. But it should be made clear that Iraq has a high CBR even by Arab-Muslim standards.

The crude birthrate is only one of the indicators of fertility. Another indicator used by population experts is the total fertility rate (TFR), which is a measure of the average number of children a woman will have throughout the years that demogra-

phers have identified as her childbearing years, usually ages 15 through 49. Whereas the CBR indicates the number of births in a given year, the TFR is a more predictive measure that attempts to portray what birthrates will be among a particular cohort of women over time. A population with a TFR of slightly higher than two has achieved replacement level fertility. This means that birthrates and death rates are approximately balanced and there is stability in the population. The TFR for Iraq is 4.9, which is well above the regional average of 3.77. In the United States and many other developed countries, the TFR is 2.1 or below. It should be noted that the TFR in Iraq has fallen from 6.6 in the late 1970s to its current rate of 4.9. But this current TFR remains well above the world's average rate of 2.8. Iraq's TFR indicates that the population will continue to grow rapidly in the future. The U.S. Census (2002) predicts that Iraq's future TFR will continue to decline, reaching a more stable figure of 2.7 by the year 2025. Unfortunately for Iraq, even with this drop in fertility, the current population will grow to 29 million by 2010, 37 million in 2020, and a double to 44 million by 2030.

Closely related to the TFR is the doubling time of the population. The doubling time, as the name suggests, is a measure of how long it will take the population of an area to grow to twice its current size. To compute a country's doubling time, we simply divide the number 70 by the rate of natural increase. In the case of Iraq, the rate of natural increase is 2.9%, higher than every country in the region excepting Saudi Arabia. Moreover, Iraq's rate of increase is nearly five times that of the United States. To calculate Iraq's doubling time, we divide 70 by 2.9, and we get a period of 24 years. It is troubling, given Iraq's current level of economic development and environmental concerns, that the country's population may double to nearly 45 million in the next two to three decades.

Countering birthrates and also shaping overall population numbers and composition is the crude death rate (CDR), the ratio between the total number of deaths in one year for every thousand people in the population. Crude death rates often reflect levels of economic development. Iraq's CDR is 6, which is slightly above the regional average of 4.71.

Death rates can be measured for both sex and age cohorts and one of the most common measures is the infant mortality rate. This figure is the annual number of deaths of infants less than one year of age compared to the total number of live births for that same year. The figure is usually expressed as number of deaths during the first year of life per 1,000 live births. The infant mortality rate has been used by researchers as an important

indicator both of a country's health care system and the general population's access to health care. Iraq's infant mortality rate is 62 deaths per 1,000 live births, which is higher than the regional average of 37 infant deaths per thousand.

Related to infant mortality and the crude death rate is life expectancy, the average number of years an infant newborn can expect to live. Infants born in Iraq in the year 2000 can expect to live an average of 66 years, while infants born in the same year in neighboring countries can expect to live an average of 71 years, indicating poorer than average health care.

Unfortunately, these statistics are only given at the national level for Iraq. It would be interesting to note differences among Iraq's different minority groups and regional differences as well. Provincial data on these statistics are not available. However, it is important to note a finding by the United States Committee for Refugees. This organization found that 800,000 Iraqi children under the age of five were chronically malnourished and that ten percent of children under age five in Baghdad, Kerbala, and Diyala indicated "wasting" (low weight for height). On the other hand, the three Kurdish-controlled northern provinces appeared to be enjoying relative prosperity, both as result of receiving a UN-mandated 13 percent of all oil-for-food revenues as well as "taxes" the Kurds impose on the lucrative smuggling operations across the Turkish and Iranian borders (USCR Country Reports, 2002).

Mobility and Migration

In addition to the population dynamics of death and reproduction, the movement of people from place to place is a critical aspect of examining population geography. Mobility is the ability to move from one place to another, either permanently or temporarily. There remains a nomadic segment of the Iraqi population. Even more important for population geographers is the millions of marginalized Kurds and Shiite Moslems who have been forced to move in the past decade because of political, economic, and environmental factors. A good example is the sizable population of Shiite Moslems in the south that have been displaced because government water control projects have drained most of the inhabited marsh areas east of An Nasiriyah (CIA World Factbook, 2002).

The second way to describe population movement is in terms of migration, which is a permanent move to a new location. Migrants permanently change their place of residence – where they sleep, store their possessions, and receive legal documents.

Migration has two forms, emigration and immigration. Emigration is migration out from a location; immigration is migration into a location. A decision to migrate stems from a perception that somewhere else is a more desirable place to live. People may hold very negative perceptions of their current place of residence or very positive perceptions about the attractiveness of somewhere else. Negative perceptions about their place of residence that induce people to move away are push factors, whereas pull factors attract people to a particular new location.

Migration from Iraq is basically resulting from three push factors- political, economic, and environmental. The Kurds and Shiite Moslems make up the majority of the population of Iraq, yet they have little say in the government. Iraq's leader, Saddam Hussein, has repeatedly repressed these groups when they have attempted to gain more autonomy. The environmental degradation ongoing in Iraq is another reason many people have decided to emigrate. Refugees are people forced to migrate from a particular country for political reasons. The United Nations defines political refugees as people who have fled their home country and cannot return for fear of persecution because of their race, religion, nationality, and membership in a social group, or political opinion (Rubenstein, 1996). According to the United States Committee for Refugees (USCR), there were more than 127,700 refugees and about 700,000 internally displaced persons in Iraq in the year 2000. Foreign refugees in Iraq include about 23,900 people from Iran and 12,600 from Turkey, mostly Kurds. The total also included about 90,000 Palestinians and about 1,200 refugees of other nationalities, including Eritreans (600), Somalis (300), Sudanese (200), and Syrians (100).

The estimated 600,000 internally displaced persons in the three northern governorates of Dohuk, Erbil, and Suleymaniyah included not only long-term internally displaced persons and people displaced by Kurdish factional fighting, but also as many as 100,000 people, mostly Kurds, Assyrians, and Turkomans, more recently expelled from the central-government controlled Kirkuk and surrounding districts in the oil-rich region bordering the Kurdish-controlled north. At least another 100,000 persons were internally displaced elsewhere in Iraq, mostly in the southeastern marshlands.

Between one and two million Iraqis with a well-founded fear of persecution were estimated to be living outside Iraq, although only about 550,000 had any formal recognition as refugees or asylum seekers in 2000. About 510,000 Iraqi refugees were living in Iran and about 5,200 refugees remained in the Rafha camp in Saudi Arabia. In 2000, some 34,000 Iraqis

applied for asylum in Europe.

Conclusion

Iraq's demographic statistics paint a bleak picture of the future prospects for the country. Iraq's economy does not currently have the capacity to grow fast enough to provide opportunities to its fast growing population. If natural growth rates are not lowered by aggressive policies, Iraq will likely require international aid to avoid famine and human misery on a massive scale. The segment of population that is most vulnerable is in Iraq is the marginalized groups, which include four million Kurds and thirteen million Shiite Moslems. The Iraqi government is certainly part of the problem. Saddam continues to spend much of his country's treasure on weapons programs and the Army. These monies could provide infrastructure improvements, health care, quality food, and new irrigation schemes.

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11
Medical Geography

MAJ Patrick E Mangin

Key Points:

- Infectious diseases endemic in the area pose a major threat to any military or relief operation in Iraq
- Public health systems are in complete disarray, increasing disease and mortality rates
- Food and water in Iraq cannot be considered safe
- Poor nutrition is a major cause of health problems
- Heat and cold also pose a human health risk in the area

A valuable resource for commanders, staff and subordinate leaders in the tactical decision-making process for any military operation is the medical geography of the area of operations. Medical geography by definition is "the application of geographical perspectives and methods to the study of health, disease and health care" (Johnson, 1996). Medical geography incorporates two broad areas of study. The first concerns the spatial ecology of disease and geographical aspects of the health of populations. The second emphasizes the geographical organization of health care. Medical geography retains associations with other disciplines outside geography concerned with health-related problems, reflecting the complexity of these problems and the need to examine them from a multidisciplinary perspective.

Officers are responsible for force protection. An integral part of the decision-making process involves addressing the specific environmental health hazards that may be encountered in a specific place. An important consideration in the calculation of a region's environmental health hazards is the health status of the indigenous population. This chapter will analyze the overall health of the Iraqi people using the distribution of disease and

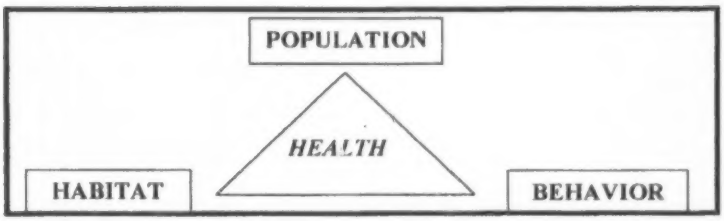

Figure 11.1 The Triangle of Human Ecology
Source: Palka, 2001

nutrition. By knowing the distribution of health and disease in Iraq, leaders can take appropriate measures depending on a mission's purpose and area of operations.

The Triangle of Human Ecology

A useful framework for analyzing the impact of health related issues at a place is the "Triangle of Human Ecology" (Figure 11.1). Three vertices form a triangle of population, behavior, and habitat which together affect a region's health (Palka, 2001). As Palka writes,

> "Habitat is that part of the environment within which people live. It includes houses, workplaces, agricultural fields, recreation areas, and transportation systems. Population considers humans as the potential hosts of various diseases. Factors affecting and yet characterizing the population include nutritional status, genetic resistance, immunological status, age structure, and psychological and social concerns. Behavior includes the observable aspects of the population and springs from cultural norms. It also impacts on those who come into contact with disease hazards and whether or not the population elects other alternatives" (Palka, 2001).

"Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease. Health is a continuing property that can be measured by an individual's ability to rally from a wide range and considerable amplitude of insults" (Johnson, 1996).

Chemical insults include pollen, asbestos, various pollutants, smoke, waste, or even food (Johnson, 1996). Infectious insults include virus, bacteria, fungi, and protozoa. Infectious insults cause debilitating endemic and epidemic diseases. Physical insults could refer to air quality, temperature, humidity, light, sound, atmospheric pressure, and trauma. Physical insults

unique to Iraq include the stress of extreme annual and diurnal temperatures, frequent dust storms and an arid climate that could contribute to dehydration.

The Impact of Gulf War Depleted Uranium Munitions on Iraqi Health

The Gulf War had both an immediate and residual negative impact on the people of Iraq from a health perspective. The obvious immediate effect of the war was the decrease in Iraqi population due to combat deaths. In addition to having a direct impact in the hostilities, the residual effects of Allied munitions on the health levels of the Iraqi people are less obvious but equally serious to the Iraqis who survived the war and their subsequent generations. Aside from Iraqi deaths caused by allied munitions, unexploded ordnance pose a risk and additionally the presence of depleted uranium (DU) rounds could represent a risk to the overall health of the Iraqis, especially children. Depleted uranium rounds fired from allied tanks and infantry vehicles are scattered about southern Iraq (Figure 11.2).

Data concerning depleted uranium in Iraqi health should be approached cautiously. While there have undoubtedly been declines in Iraqi health, there is little evidence in any peer reviewed sources that suggests a "cause and effect" of DU and cancer in southern Iraq. Based on available reports, DU is certainly radioactive and if ingested or inhaled or handled for long periods (weeks), there could be long term health effects. Troops operating in the theater should follow established procedures when coming into contact with DU ordnance.

The Health and Medical Impact of UN Sanctions

A second Gulf War related factor contributing to the decline in health is United Nations Resolution 661 of 1990. This Resolution effectively cut off all shipments of commodities and products to Iraq (United Nations, 1990). Medical supplies (medicine, vaccinations and medical item repair parts for clinics and hospitals) and food could no longer be imported into Iraq. This was done to reduce Iraq's combat effectiveness. The immediate impacts of the sanctions were readily seen in the steady decline in the health of the Iraqi population, especially children. According to a survey by the United Nations Children's Fund (UNICEF), though the death rate of Iraqi children five years and younger steadily declined during the 1980s, it more than doubled to 120 or 130 persons per thousand during the

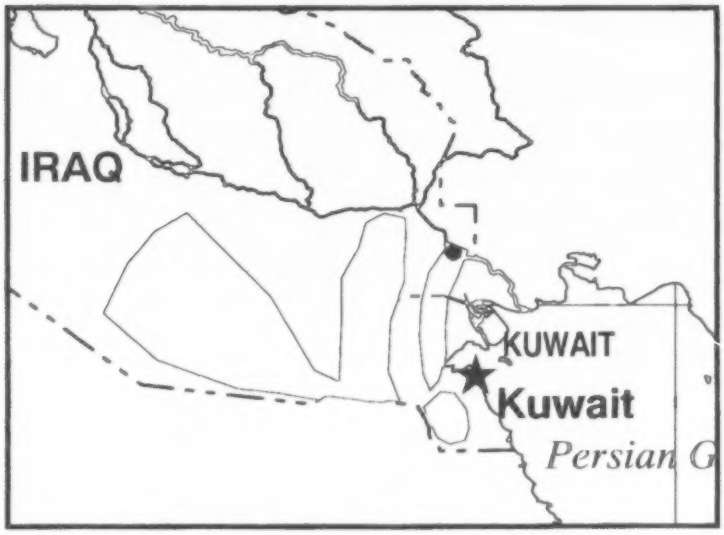

Figure 11.2 Primary Areas of Depleted Uranium Expenditure During the Gulf War
Source: Department of Defense, 1998

1990s after the Gulf War (UNICEF 1999) (Figure 11.3). Figure 11.3 suggests that Iraq showed a substantial reduction in the under-five mortality rate during the 1980s. Had this trend continued through the 1990s, there would have been half a million fewer deaths of children under-five in the country as a whole during the eight year period 1991 to 1998 (UNICEF 1999). Therefore, there seems to be a clear correlation between increased child mortality and the lack of food and medical supplies stemming from the UN sanctions.

In the early 1990s, the situation regarding food supplies in Iraq became critical because food sanctions were imposed in Iraq, a arid country with limited agricultural opportunities and a growing population. The combination of an arid climate and a growing population contributes to Iraq being a net importer of foodstuffs, such as cereals (Figure 11.4). Prior to the war, Iraq had to import a significant amount of grains, vegetables and fruit to support itself. After the cease-fire, Iraq could still not import these goods, so nutrition suffered. In light of this, in 1992, the UN Security Council adopted Resolution 706, "offering an opportunity for Iraqi oil to be sold and the revenue used to purchase essential humanitarian supplies (UNOIP,

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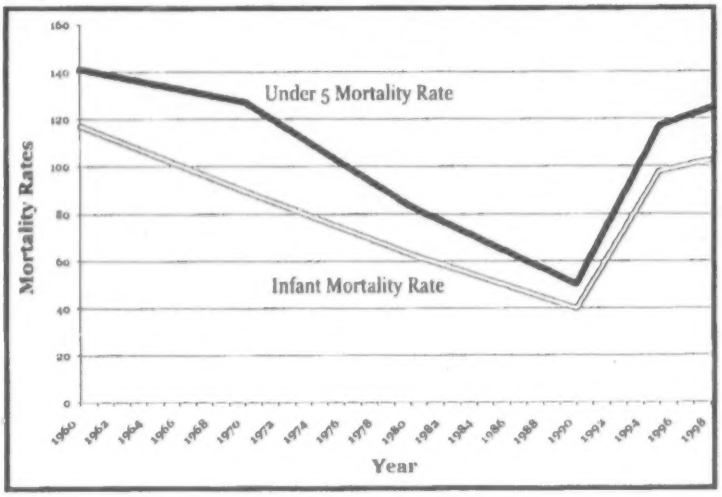
"Implementation" 2002). Unfortunately, the Iraqi government refused the terms of the resolution and food sanctions continued mainly because Saddam Hussein's regime was not cooperative with UN inspectors who were not allowed to inspect many places thought to be manufacturing weapons of mass destruction (WMD). The WMD inspections were a part of the cease-fire agreement between the Allies and Iraq.

Agricultural Production

Owing to its arid climate, Iraq is agriculturally constrained to riparian (near rivers) areas and therefore irrigates otherwise non-arable land. Irrigated cropland makes up 60 percent of Iraq's available cropland. Irrigation, though, does not allow Iraq to support its food needs. The amount of land Iraq can irrigate has significantly declined in the past decade owing to Turkey's Anatolia Project.

The Grand Anatolia Project is a multiple Turkish dam project designed to improve Turkey's hydroelectric and irrigation capability. The Turkish government has built 22 dams on the Tigris and Euphrates rivers which reduces the volume of water flowing into Iraq. The upstream dams reduce the volume flowing into Iraq in three ways. First, the increased surface area of the reservoirs created by the dams allows for more evaporation.

Figure 11.3 Infant and Child Mortality Rates, 1960 to 1998
Source: UNICEF, 1999



Second, the water becomes still and a higher hydraulic head is created, forcing more groundwater seepage. Third, the water in the reservoirs is pumped throughout Turkey for agricultural irrigation and industrial uses. Reduced water flow has negatively impacted Iraq's agricultural production. The marshes of southern Iraq, an important agricultural area, are drying up in part from less water entering them. The amount of water available to irrigate other areas is reduced. This has meant less food for Iraq in the post Gulf War period. To make matters even worse, Iraq has had a three-year long drought going back to 1999.

The impact of less water has meant less food and this leads to undernutrition and malnutrition. Combined, undernutrition and malnutrition contribute to poor health (increases in disease occurrence) and increased death rates (especially in children). Undernutrition means that the Iraqis do not get the necessary caloric intake to maintain their health, and malnutrition means that the Iraqis do not get well-balanced sources of nutrition necessary to stay healthy and fight off disease. Iraq Ministry of Health statistics indicate that the caloric intake of the Iraqi people is down one-third from pre-war states. Since an individual's ability to rally from a wide range and considerable amplitude of insults is directly related to nutrition, Table 11.1 reflects an overall increase in the Iraqis succumbing to various diseases owing to malnutrition and undernutrition (Table 11.1). Also, newborn birth weights are down significantly as well as increased infant cases of kwashiorkor (protein deficiency) and marasmus (malnutrition) (Table 11.1). The infant mortality figures indicate that in 1989, there were 7,110 infant deaths under the age of five; in 1999, there were 73,572 (Iraq Ministry of Health, 2001.)

Eventually, Iraq agreed to an oil-for-food program. At the end of 1996, "the United Nations and the Government of Iraq agreed on the details of implementing resolution 986 (1995), which permitted Iraq to sell up to two billion dollars worth of oil in a 180-day period" in order that Iraq could buy food (UNOIP, "Oil-For-Food" 2001). The ceiling on oil sales was eased during 1998 and finally lifted in 1999, enabling the program to move from a focus on food and medicine to repairing essential infrastructure, including the oil industry. Declines in public health infrastructure, such as liquid waste disposal and water treatment can directly relate to the type of diseases seen in Table 11.2.

In the petrochemical sector, the first oil was exported on 15 December 1996 and the first contracts financed by the sale of oil approved in January 1997. The first shipments of food arrived

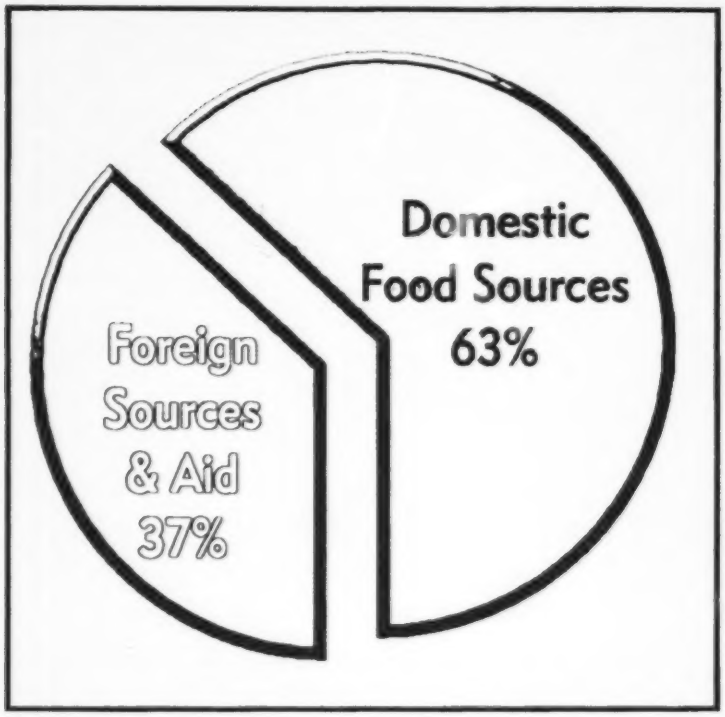


Figure 11.4 Net Cereal Imports as a Percent of Total Cereal Production
Source: Based on Data from the World Resources Institute, 2000

in Iraq in March 1997 and the first medicines arrived in May 1997. The Security Council has continued the program in 180-day periods called "phases". "The current oil exporting period is phase XI, authorized by Security Council resolution 1382 (2001), which came into effect on 1 December and runs through 29 May 2002" (UNOIP, 2001).

Since the first food arrived in March 1997, foodstuffs worth almost $8 billion have been delivered to Iraq. Although it is difficult to assess the impact of the program, the average daily food ration has gradually increased from around 1,275 kilocalories per person per day in 1996 (before the program) to about 2,229 kilocalories in October 2001 (UNOIP, 2001).

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Medical Supplies

The sanctions have also contributed to declining health care supplies. There are shortages of the most basic medical supplies. Everything from bandages, sheets, rubber gloves and syringes are carefully managed or are even dangerously reused. Sanitation equipment is faltering owing to a decline in repair parts. Vaccination supplies are low, contributing to the increased cases of diseases shown in Table 11.2. A lack of vaccinations contributes to people succumbing to common communicable diseases that they would normally ward off. "Common communicable diseases preventable by vaccination, which are provided [to] nearly all children in developed countries and were standard in Iraq before 1990, have increased by multiples" (Clark, 2000). While occurrence rates for these diseases fluctuate, those of malnutrition-related diseases and death rates in general do not; because of the cyclical nature of their communication, they have increased at a regular rate, and afflicted an additional hundreds of thousands of children. For example, "Increases in 1998 over 1989 were as follows: whooping cough, 3.4 times; measles, 4.5 times (25, 818 cases); mumps, 3.7 times (35,881)" (Clark, 2000).

Not only are medicines and vaccination in short supply, but also less obvious items are lacking that contribute to poor health. Johnson described the hospitals as lacking in the most basic of cleaning and medical supplies and struggle with electricity problems. "They [the hospitals] are infested with flies and smell of urine and feces. The electricity is turned off periodically each day to conserve. Due to a lack of supplies and medicines, patients succumb everyday to illnesses that normally are easily treated." (Johnson, 1999). Clinics and hospitals that

Table 11.1 Nutrition Indicators, Iraq, 1989 and 1999
Source: Iraq Ministry of Health, 2001

Indicator	1989	1999
Calories/day	3089	2100-2200
Birth Weight < 2.5 kg	102 g/day	46-47 g/day
Kwashiorkor	4.5%	24%
Marasmus	41/month	2091/month
Underweight	1-2%	21%
Proportion of families consuming animal protein	100%	46%
	104	

Disease	1989	1999
Typhoid	1,812	23,392
Cholera	0	2,398
Poliomyelitis	10	75
Diphtheria	96	142
Measles	5,715	9,920
Pertusis	368	466
Tuberculosis	14,312	29,897

Table 11.2 Disease Incidence in Iraq, 1989 and 1999
Source: Iraq Ministry of Health, 2001

cannot disinfect instruments and wards will likely see increased levels of disease.

Since 1997, under the Oil-for-Food Program, health supplies worth about $1.5 billion have been bought, but health trends still show significant declines.

Cultural Influences on the Health of Iraqis

Iraq's population growth continues to detract from its health. The population growth rate is estimated at 2.8 percent (UN Population Policy Data Bank, 2000). A growth rate of 2.8 percent means that Iraq's population may double in 25 years. Between 1995 and 2000, the average female fertility rate was 5.3. This means that the average woman between the ages of 15 and 49 has about 5 children. A growing population under UN sanctions means an inverse relationship; more mouths to feed and a declining amount of food available. Islamic culture has a lot to do with the burgeoning population. Birth control is a good example, as the following quote highlights:

> Birth control is virtually non-existent in Iraq, as limiting births or interfering with conception in any way is against the laws of Islam. Life is considered a gift from God. Likewise, abortion in any form would be out of the question. However, the Iraqi people are beginning to understand that their population growth is unsustainable and have begun to use; [modern contraception]. Even among husbands, support for birth control is growing. There is an acceptance, or at least a rationalization, that limiting births is a means for adaptation and economic sufficiency (Kemp, 2000).

Iraqi adherence to Islamic dietary laws is an area where Iraqi cultural beliefs contribute to better health. *Halal* foods (legal in the religious sense) contribute to Iraqi health from a nutrition standpoint. Briefly, any meat consumed by a Muslim must come from an animal slaughtered by another Muslim in a prescribed way, or it is considered impure, *haram* (illegal in the religious sense). This means their meat is usually well-prepared. Furthermore, pork and alcohol are especially haram and are not consumed by most Iraqi Muslims. The immediate impact of no pork or alcohol is the generally low heart and lung disease in Iraq. This is quite opposite of the U.S., for example, in which these diseases are leading causes of death.

Water Supply and Health

The living and sanitary conditions in Iraq can be summarized from an excerpt from the Defense Intelligence Agency's "Medical Environmental Disease Intelligence and Countermeasures" CD-ROM:

> Living and sanitary conditions are poor and continue to deteriorate. Expanding slum areas place additional demands on an already overburdened urban infrastructure. Shelters constructed by migrants on vacant lots in slum areas house an average of six persons in a single room. Urban sewage floods homes and streets because of inoperative electric pumping stations. Untreated waste water discharges into surface water sources.
>
> Iraq's draining of Shiite-inhabited southern marshes is expected to cause the die off of reed beds upon which the inhabitants depend for house-building materials, cattle fodder, and fuel. As the government of Iraq continues to drain marshes, it is expected that more refugees will continue to flow to Iran.
>
> Raw sewage contamination of water sources is the most significant pollution problem. Disrupted irrigation systems are resulting in desertification in many areas of the country. Movement of heavy weapons and troops has caused extensive soil damage, particularly in the fragile desert soil near Saudi Arabia (DIA-AFMIC, 2001)

About one-half of Iraq's population obtains water directly from surface sources, such as rivers, reservoirs, irrigation canals, drainage ditches, and open wells. The remaining one-half depends on municipally supplied and bottled water (DIA-AFMIC, 2001).

Water and sewer facilities sustained severe damage during the course of military operations in the Gulf War. Air and ground forces destroyed or damaged many water treatment

Figure 11.5 Iraq Water and Sanitation Programs 1999 to 2001
Source: Based on Data from Relief Web, 2001

plants, pumping stations, laboratories and other related equipment, particularly in the southern governorates. Therefore, after the war, a primary mission of Iraq's government was to rehabilitate the water supply and sewage systems.

"Prior to the Gulf War, municipal water systems provided treated water to 95 percent of the urban population, but only to 40 percent of rural populations" (DIA-AFMIC, 2001). Due to the sanctions, the construction of 18 water treatment projects was halted because of a lack of necessary building materials. These projects were under construction when the aggression started and were 45-95% from being complete. The total annual capacity of these projects was 980 million m^3 /year representing 48% of the present total water supply capacities (DIA-AFMIC, 2001)

There is good news, however, in that Iraq has rehabilitated previously existing water treatment plants to about 50-60 percent of their pre-war capacity. However, keeping them operational is difficult owing to a lack of repair parts. For example, instead of replacing leaking pipes, duct tape is often used as a permanent solution (Iraqi Ministry of Health, 2001). The sanctions impact rural inhabitants the most. Large numbers

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of people in the rural areas are without access to safe drinking water or receive it in inadequate quantities. The situation is further aggravated by a severely limited availability of purification chemicals and poor maintenance of purifying equipment. "Chemical plants producing alum, chlorine, and sulphate needed to treat water were damaged during the war," and their production capacity remains limited by the sanctions" (DIA-AFMIC, 2001). As a result of the Oil-for-Food program, the Iraqi government has begun to invest in water sanitation programs (Figure 11.5). Until these are completed, in most rural areas the water is poor and contaminated.

Major Waterborne Diseases

"During the World Health Organization's decade of water development in the 1980s, water-related diseases were classified into three development-related categories: water-borne diseases, which were ingested; water-washed (or unwashed) diseases, which were preventable by hand/hair/clothes/floor/washing and other hygiene; and water-based diseases, which were vectored diseases requiring water for the vector. Table 11.3 includes most of the major infectious diseases" (Meade and Earickson, 2000).

Reportedly, the incidence of many diseases appears to have stabilized above pre-Desert Storm levels; however, the actual magnitude and contributory causes of the increases remain unclear. In many areas, particularly northern and southern regions, the increases probably are more attributable to political choices by the Iraqi regime, including inequitable restoration of health services, rather than the effects of sanctions and the United Nations' embargo (DIA-AFMIC, 2001).

Waterborne Diseases Spread or Contracted Through Intestinal or Urinary Tract

Sanitation is extremely poor throughout the country, including major urban areas. Local food and water sources are heavily contaminated with pathogenic bacteria, parasites, and viruses to which most US service members have little or no natural immunity.

"Diarrheal diseases (cholera and dysentery) can be expected to temporarily incapacitate a very high percentage of personnel within days if local food, water, or ice is consumed" (DIA-AFMIC, 2001). The overall risk from both cholera and diarrheal diseases is elevated during the warmer months, May through September. Cholera is caused by ingestion

of causative agent, primarily in water contaminated with feces or vomitus from infected humans.

Hepatitis A and hepatitis E can cause prolonged illness in a smaller percentage. Hepatitis A is highly endemic and may pose a major health risk to nonindigenous personnel. Most Iraqis contract hepatitis A virus infection during childhood. Hepatitis E has been reported, but endemic levels are unclear (DIA-AFMIC, 2001). There is no vaccine against hepatitis E, and immunoglobulin prepared in Europe or the US does not provide protection. (Benenson, 1995) As for many other enteric infections, avoidance of contaminated food and water is the only effective protective measure.

Typhoid is caused by ingestion of causative agent in food and water contaminated by feces or urine from infeced humans. The risk is elevated in crowded, populated areas with poor sanitation, especially during warmer months (Benenson, 1995).

Poliomyelitis is a viral infection occurring in areas where sanitation is poor. There were only 10 cases in Iraq in 1989, but this number has increased as sanitation declines (Table 11.2). Current immunizations and vaccinations protect soldiers from this disease. The larger urban areas of Iraq have the most concentrated cases of poliomyelitis because it is a disease that can be contracted by proximity to hosts of the virus. However, the overall ratio of hosts per population is higher in rural areas owing to decreased medical care availability.

Waterborne Diseases Spread by Arthropods

During the warmer months of May to November, the climate and ecological habitat support large populations of arthropod vectors, including mosquitoes, ticks, and sand flies. (DIA-AFMIC 2001) Significant disease transmission is sustained countrywide, including urban areas. Serious diseases may not be recognized or reported due to the lack of surveillance and diagnostic capability.

Malaria is the major vector-borne risk in Iraq, capable of debilitating a high percentage of personnel for a week or more (Benenson, 1995). Principal risk areas include rural and urban locales in the northern provinces of Dahuk, Ninawa, Arbil, As Sulaymaniyah, and At Ta'mim, where transmission occurs from April through November, with a seasonal peak during July through August. Scattered foci probably occur in central and southern areas from the Tigris-Euphrates River Basin to the border with Iran. Transmission occurs from mosquitos year-round, initially peaking during April through May, followed by a

Waterborne	Water Unwashed	Water Based
Diarrheal	Intestinal worms	Malaria
Typhoid	Amebic dysentery	Filariasis
Cholera	Colds	West Nile Fever
Hepatitis A	Typhus	Schistosomiasis
Hepatitis E		
Polio		

Table 11.3 Major Diseases Related to Water
Source: Adapted from Meade & Earickson, 2000

secondary peak during August through September (based on data from Iran). In endemic areas, transmission primarily occurs in rural areas up to 1,500 meters elevation. This is because higher elevations are cooler in temperature and mosquitoes require warmer temperatures to survive. Baghdad and the immediate vicinity probably are low risk as a result of increased awareness and government funding of pesticide-based mosquito larvae eradication programs.

Malaria is endemic at increasing levels in the northern rural areas, associated with Kurdish rice farming and lack of insecticides during 1993 and 1994. The practice of rice farming encourages stagnant water, a prime breeding habitat for mosquitoes. Low-level focal transmission probably occurs in isolated locations in central and southern areas, with risk greater in southern areas adjacent to Iran. Nearly all indigenous cases are caused by a form of malaria called plasmodium vivax.

Plasmodium vivax is generally not life-threatening except in the very young, the very old, and in patients with concurrent disease or immunodeficiency (Benenson, 1995). The distribution of plasmodium vivax is consistent with areas under 1500 meters in elevation, as mosquitoes are not adapted for cool temperatures. Therefore, soldiers in the northeast region operating in high altitudes would have little concern for mosquito protection.

Sand Fly Fever transmission occurs primarily from April through November, peaking in July through September, coinciding with vector activity. Foci may occur throughout the country, with elevated risk in village and peripheral urban areas, paralleling the distribution of sand fly vectors. Risk may be limited along the southwestern border with Saudi Arabia. Sand Fly Fever is caused by the bite of an infective sand fly. *Phlebotomus papatasi*, the primary vector, is most active between dusk and dawn, has a limited flight range, is

peridomestic in its breeding habits, and readily enters human habitations to feed. Other vector-borne diseases that are less significant, but exist, include typhus, spotted fever rickettsioses, and plague.

Climate and Topographic Considerations for Force Protection

Two concepts that will impact military operations in Iraq stem from its climate. First, extreme diurnal and annual temperatures will require logisticians to adequately plan for equipping and maintaining the force. Second, the diurnal temperature ranges are most extreme in the high elevations of the northeast highlands and in the arid southwest. Tactical operations in these locations require that units have training and equipment commensurate with Iraq's climate and also its desert topography. Iraq presents combat forces with conditions ripe for challenging force protection including heat exhaustion from high temperatures, eye protection from the sun and dust storms, potential animal bites from snakes, spiders and scorpions, and risks for vehicle and aircraft safety from steep sand dunes, wadis and blowing sand. A tremendous resource for force protection is the Army's Center for Army Lesson's Learned newsletter entitled, "Winning in the Desert" (U.S. Army, 1990).

Annual temperature ranges will impact climate-specific supply cycles because of Iraq's very warm summers and cooler winters. There are generally two temperature zones, and the significant differences between the southern and northern climate zones will impact logistical planning based on friendly force zones of operation. In the north, cooler temperatures down to 5° F will present soldiers with challenges unique to staying warm and hydrated. In the south, warm summer temperatures will require logistic planners to stockpile water from outside sources since Iraq's water supply should be considered non-potable for non-indigenous personnel. Strategic logistic analysis will require consideration of the annual temperature ranges to properly equip and maintain the force as the seasons change in Iraq.

The diurnal temperature ranges will impact daily operations. As the sun rises, its shortwave radiation heats the earth's surface and the earth retransmits longwave radiation which is felt as heat. Daily maximum temperatures in Iraq can exceed 100 degrees Fahrenheit. This requires force protection measures such as forced hydration and medical supplies like intravenous fluids. Owing to the desert environment, minimum temperatures at night feel much cooler because of the daily temperature range.

Temperature ranges exceeding 50 or more degrees are not uncommon.

Conclusion

Medical Geography plays a key role in understanding Iraq's culture and also in force protection. The analysis of medical geography requires a synthesis of information taken from nearly every subfield of geography. The health of the Iraqi people can be attributed, but not limited to, the subject matter contained in every chapter of this book. Iraqis need to make great strides in the near future if they are to overcome the nutritional deficiency and diseases that plague them. Understanding the medical geography of Iraq is crucial to ensure force protection. Commanders and their staffs must consider this information in current and future decision-making in order to accomplish their tactical missions. Lastly, there are numerous declassified documents available at http://www.gulflink.osd.mil that provide resources for medical treatment of the various diseases (GulfLINK, 1996).

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12
Conclusion

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Any geographic analysis of a country is naturally a snapshot in time. Iraq, as it has done from the time it was Mesopotamia, will continue to change. But when change inevitably drops another layer of sand on this historic area, beneath the surface will be a cultural and physical pattern likely to resemble the current one. This is the strength of understanding the geography of a country, the recognition of what is likely to change and what is likely to remain.

The material in this book represents our best attempt to provide military and government planners with an introduction to the complex geography of this important country. In doing so, we hope it will raise further questions and open avenues for additional research.

What we have not been able to do, however, is to fully analyze Iraq in the context of the larger region it shares with its important neighbors. Water disputes cause tensions with Syria and Turkey, as does the status of the Kurds. The wellbeing of Shiite populations in the south periodically revives animosities with Iran that were at the heart of the Iran-Iraq War. Kuwait still guards against Iraqi claims on its territory, and Saudi Arabia balances stability in the region with fundamentalist groups within its borders who are sensitive to the preservation of important Islamic historical sites within Iraq. Any military or diplomatic decisions regarding Iraq will undoubtedly have an effect on the larger region.

The lesson of this book should be that Iraq is not a single entity. Within its borders are a variety of physical and human regions that differ in their areal extent. And although these regions are generalizations based on common features, such as language or climate, they help us take a first step towards a more thorough understanding. With this knowledge we hope that military and governmental leaders will gain the wisdom to properly deal with this troubled land.

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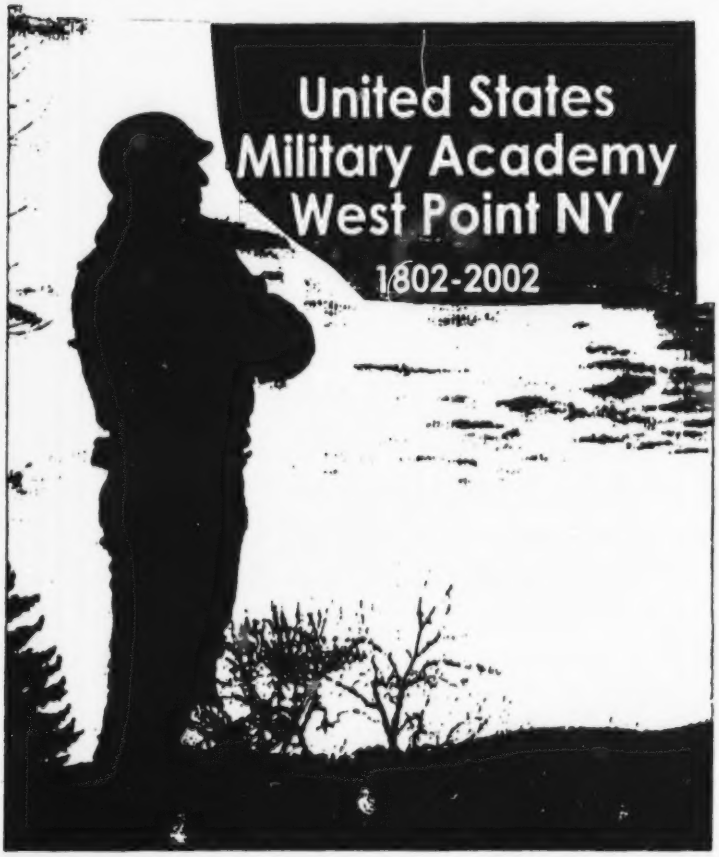
Iraq

a geography

Written by the Geography Faculty of the Department of Geography and Environmental Engineering



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